CITY OF LOS ANGELES

THE PORT OF LOS ANGELES

# HARBOR DEPARTMENT



## SPECIFICATIONS FOR

AVALON PEDESTRIAN BRIDGE AND
PROMENADE GATEWAY

SPECIFICATION NO. 2804A

APPL. PORT. PERMITS NO. 160720-109

CONTRACT NO.

CONTRACTOR Skanska USA Civil West

AMOUNT $ 101,930,015.00

TIME TO COMMENCE Notice to Proceed

TIME TO COMPLETE 900 Calendar Days

BOARD OF HARBOR COMMISSIONERS

TRANSMITTAL 2

Ad

# Avalon Pedestrian Bridge and Promenade Gateway 2804A

Closed

None

## Email History

All

December 09, 2025 10:14 AM (PST) Prospective Bidder: PRE-BID MEETING REMINDER

December 16, 2025 10:32 AM (PST) Prospective Bidder: PRE-BID MEETING

December 16, 2025 3:50 PM (PST) Prospective Bidder: BIDDER'S GUIDE

December 16, 2025 3:50 PM (PST) Prospective Bidder: BIDDER'S GUIDE

December 16, 2025 3:50 PM (PST) Bid Edit: Notice of Bid Update for Avalon Pedestrian Bridge and Promenade Gateway (2804A)

December 22, 2025 2:33 PM (PST) Prospective Bidder: BID CLOSING

*To: Highland Commercial Roofing (Brian@highlandroof.com), MZB Traffic Management Inc. (info@mzbinc.com), Sankofa Company (vanessa@sankofacompany.com), SULLY-MILLER CONTRACTING COMPANY (bids@sully-miller.com), Pavement Recycling Systems (estimating1@pavementrecycling.com), Polo 4PL (david@polo4PL.com), Condon Johnson & Associates (cjascbids@condon-johnson.com), SOFFA ELECTRIC INC (SALES@SOFFAELECTRIC.COM), Ortiz Enterprises, Inc. (estimating@ortizent.com), TORO ENTERPRISES.COM (ESTIMATING@TOROENTERPRISES.COM), Adams & Smith, Inc. (phil@adamsandsmith.com), Superior Pavement Markings (Darren@Superiorpavementmarkings.com), Griffith Company (aarroyo@GRIFFITHCOMPANY.NET), Environmental Construction, Inc. (estimating@environcon.com), Powell Constructors Inc (joes@powellconstructors.com), DKBK Electric Inc. License# 1115498 (dkbkelectric23@gmail.com), Martinez Steel, LLC (jhickman@martinezsteel.com), Coreslab Structures (L.A.) Inc (Jreinbolt@coreslab.com), Skanska (marissa.danbo@skanska.com), Universal Underground Utility General Contracting LLC (abrooks@u3gc.com), Marina Landscape Inc. (estimator@marinaco.com), Griffith Company (socalbids@griffithcompany.net), Anker Advisory Group (scerri@ankeradvisors.com), Allied Solutions (contracts@alliedsolutionenterprise.com), Comet Electric, Inc. (kellenblohm@cometelectric.com), Balfour Beatty Infrastructure, Inc. (kneven@balfourbeattyus.com), LEED Electric, Inc. (estimating@leedelectric.com), CA Traffic Solution (g.solis@catrafficsolution.com), MWC Group, Inc (cyndi.campbell@mwcgroup.net), All American Asphalt (publicworks@allamericanasphalt.com), MCM Construction, Inc. (rburch@mcmconstruction.com), Fatzer AG (frank.amend@fatzer.com), Mariscal Painting Inc (mariscal-painting@hotmail.com), Taft Electric Company (dmeans@taftelectric.com), Lakewood Pipe & Fabrication (drew@lakewoodpipe.com), Perimeter Security Group (bids@perimetersecuritygroup.com), South Coast Lighting & Design (mattk@southcoastlighting.com), CMC Rebar (pamela.pacheco@cmc.com), Schwager Davis, Inc. (estimating@schwagerdavis.com), Lucas Builders, Inc (sam@lucascompany.com), PAUL HANSEN ENGINEERING (PATRICIA.MCCARTHY@PAULHANSENENGINEERING.COM), V&E Tree Service (dale@vetreeservice.com), Next Century Rebar, Inc. (matt@nextcenturyrebar.com), Ferreira Construction Co, Inc DBA Ferreira Coastal Construction (chhill@ferreiraconstruction.com), Easy Waste Management (jose@easywm.com), Integrity Rebar Placers (dadams@integrityrebarplacers.com), Meridian Precast Inc (info@meridianprecast.com), Austin Enterprise (estimating@austin-enterprise.com), Structural Technologies, LLC (tcarter@structuraltec.com), Royal Electric (estimating-email@royalelect.com), SoCal Geotechnical,Inc. (Info@socal-geo.com), COWI (kugh@cowi.com), DSS Street Sweeping Inc (sales@dssrentals.com), ICAK (eun.icak.us@gmail.com), PERI Formwork Systems, Inc. (german.ordonez@peri.com), Mullis Insurance (dmullisinsurance@gmail.com), Fortech Solutions Inc (estimating@fortechsolutions.com), Calmex Engineering, Inc. (jordenm@calmex.us), Schneider Electric (troy.vanhoesen@se.com), OlsenBeal (travis@olsenbeal.com), Danny Letner, Inc. dba Letner Roofing Company (bids@letner.com), SSL LLC (andrewt@mseplus.com), The Quality Firm (marketing@thequalityfirm.com), Beyond Lumber (Ed@belumber.com), Teufelberger-Redaelli (benedict.moon@redaelli.com), Traylor Bros., Inc. (aedwards@traylor.com), Capital Industrial Coatings (j.uhles@capital-ic.com), F.D. Thomas, Inc. (bids@fdthomas.com), Ferguson (januszewski@ferguson.com), Oldcastle Precast Inc (britt.sweet@oldcastle.com), EBS General Engineering, Inc. (bids@ebsgeneral.com), Martinez Steel, LLC (ewhitten@martinezsteel.com), LA-Decks (ladecks@gmail.com), VT Electric, Inc. (tony@vtelectric.net), Summit Environmental Contractors (grace@summitenvcon.com), Techno Coatings Inc. (nick@technocoatings.com), Forefront Deep Foundations (jbird@forefrontdeepfoundations.com), United Pacific Services, Inc. (eric@unitedpac.com), Granstrom Masonry, Inc. (Estimating@GranstromMasonry.com), GPA Consulting (danielle@gpaconsulting-us.com), CraneVeyor Corp. (esamayoa@craneveyor.com), Construct Connect (content@constructconnect.com), Los Angeles Signal Construction Inc (estimating@lasignal.com), Sterndahl Enterprises Inc (clara@sterndahl.com), Cat Tracking Inc. (estimating@cattrackinginc.com), ECORP Consulting, Inc. (proposals@ecorpconsulting.com), SpectraTurf (estimating@spectraturf.com), Gexpro (jeff.wallace@gexpro.com), Foundation Pile Inc (estimating@foundationpileinc.com), Paramount Metal & Supply Co. (hjimenez@paramountmetals.com), Mountainview Biological Consulting (proposals@mtn-bio.com), Legacy Reinforcing Steel LLC (brian.briggs@legacyreinforcingsteel.com), Sierra Landscape Development (bids@sierralandscapedev.com), Vulcan Materials (calbids@vmcmail.com), COR-RAY PAINTING CO. (dtracy@corraypainting.com), Marvella Steel Placers (jpruitt@marvellasteelplacers.com), Kern County Builders Exchange (kcbex@kcbex.com), Maxim Crane Works (cclark@maximcrane.com), Urban Habitat (Brett@MyUrbanHabitat.com), Axiom Group (esteban@axiomcm.com), The J.V. Land Clearing Company Inc. (griffin@thejvco.com), Global Electric (william@globalelectric.us), Tipco Engineering Inc (adamwill@tipcoeng.com), DS Brown Co (Rleonard@dsbrown.com), V3 Construction Inc (ahronv@v3constructioninc.com), Pinnacle (christopher.pratt@kiewit.com), Camblin Steel Services (sarah.knight@camblinsteel.com), Certerra-RMA Group (ralcantara@rmacompanies.com), Cal West Lighting Services Inc. (joshua@thecalwest.com), Ferguson Enterprises (will.correa@ferguson.com), Geoquest USA (marugenia.zamora@geoquest-group.com), Structural Technologies, LLC (jgregory@structuraltec.com), Champion Painting (west-bids@championssc.com), KWH Constructors, Inc. (tvanderlinden@kwhconstructors.com), A&A Ready Mix (cdavis@bristolmsi.com), CGO Construction Company, Inc. (seyi.ojuri@cgoconstruction.com), Core & Main - Santa Ana #594 (loren.galati@coreandmain.com), Regional Steel Corporation (melissa@regionalsteelcorp.com), Park Associates Inc (dena@parkplanet.com)*

This is a notification pertaining to **Avalon Pedestrian Bridge and Promenade Gateway (2804A)**, with a bid due date of December 22, 2025 2:45 PM (Pacific).

The project bid closing has been changed to 4:00 PM PT on December 22, 2025.

Please visit the bid details for more information.

December 22, 2025 2:34 PM (PST) Bid Edit: Notice of Bid Update for Avalon Pedestrian Bridge and Promenade Gateway (2804A)

December 22, 2025 4:19 PM (PST) Bid Results: 3-DAY DOCUMENTS

The time was changed from 2:45pm to 4:00pm due to a software glitch in PlanetBids.

TABLE OF CONTENTS
BIDDING REQUIREMENTS


| SECTION | TITLE | PAGES |
|---|---|---|
| 00012 | NOTICE INVITING BIDS | 1-5 |
| 00022 | INFORMATION FOR BIDDERS | 1-10 |
| .01 | General | 1 |
| .02 | Form of Proposal | 1 |
| .03 | Proposal Irregularities and Alterations | 1 |
| .04 | Proposal Signatures | 1 |
| .05 | Proposal Guaranty | 2 |
| .06 | Affidavit of Noncollusion | 2 |
| .07 | Federal Excise Tax | 2 |
| .08 | Retail Sales or Use Tax | 3 |
| .09 | Duties | 3 |
| .10 | Withdrawal of Bid | 3 |
| .11 | Interpretations and Addenda | 3 |
| .12 | Bidders to Investigate | 3 |
| .13 | Existing Information | 4 |
| .14 | Subcontracts | 4-5 |
| .15 | Mandatory Provisions Pertaining to Non-Discrimination in Employment | 5 |
| .16 | Small, Very Small, Minority, Women, Disabled Veteran, and Other Business Enterprise (SBE/VSBE/MBE/WBE/DVBE/OBE) | 6 |
| .17 | Award of Contract | 7 |
| .18 | Bond Assistance Program | 7 |
| .19 | Release of Public Records | 8 |
| .20 | Business Tax | 8 |
| .21 | Bidders Check List | 9-10 |
| 00030 | BIDDING DOCUMENTS | 1-60 |
| .01 | Bid Bond | 1 |
| .02 | Affidavit of Noncollusion | 2 |
| .03 | Mandatory Provisions Pertaining to Non-Discrimination in Employment | 3-22 |
| .04 | Mandatory Provisions Pertaining to Non-Discrimination in Employment and Affirmative Action in Hiring Employees | 23-24 |
| .05 | Equal Benefits Ordinance Compliance Affidavit | 25-27 |
| .06 | Small Business Enterprise Program (SBEP) | 28-32 |
| .07 | Contract Solicitations Charter Section 470 (c) (12) | 33-34 |
| .08 | Iran Contracting Act of 2010 | 34 |
| .09 | Iran Contracting Act of 2010 Compliance Affidavit | 35 |
| .10 | Contractor Ownership / RAMP Outreach Affidavit | 36-37 |
| .10A | Monthly Subcontractor / Supplier Monitoring Report | 38-39 |
| .11 | Federal Requirements for Federal-Aid Construction | 40-44 |
| .12 | Proposal | 45-47 |
| .13 | Bid Proposal Line Items | 48-60 |

TABLE OF CONTENTS
BIDDING REQUIREMENTS


| SECTION | | TITLE | PAGES |
|---|---|---|---|
| 00060 | | CONTRACT | 1-14 |
| | 1.1 | Contract Documents | 1 |
| | 1.2 | Work to be Done | 1 |
| | 1.3 | Contract Time | 2 |
| | 1.4 | Liquidated Damages | 2-3 |
| | 2.1 | Payments to Contractor | 3 |
| | 3.1 | Quality of Services | 3 |
| | 3.2 | Indemnification | 3-4 |
| | 3.3 | Insurance | 5-10 |
| | 3.4 | Compliance with Laws | 10 |
| | 4.1 | Binding Effect | 10 |
| | 4.2 | Notices | 11 |
| | 4.3 | Relationship of Parties | 11 |
| | 4.4 | Entire Agreement | 11 |
| | 4.5 | Legal Justification and Recourse | 11 |
| | 4.6 | Time of Essence | 12 |
| | 4.7 | Labor Code Section 1861 | 12 |
| | 4.8 | Assignment of Certain Causes of Action | 12 |
| | 4.9 | Termination Due to Non-Appropriation of Funds | 12-13 |
| | 4.10 | No Waiver | 13 |
| | 4.11 | Joint and Several Obligations of Contractor | 13 |
| | 5.1 | Signatures | 14 |
| 00070 | | PERFORMANCE BOND | 1 |
| 00074 | | PAYMENT BOND | 1-2 |
| 00078 | | AFFIDAVITS OF COMPLETION | 1-5 |
| 00660 | | CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION | 1-5 |
| | .01 | Contractor/Subcontractor/Supplier Information Form | 1-2 |
| | .02 | Subcontractor/Supplier Ownership Affidavit | 3-4 |
| | .03 | Supplier List | 5 |
| 00860 | | CONTRACT DOCUMENTS | 1-2 |

TABLE OF CONTENTS
BIDDING REQUIREMENTS


| SECTION | TITLE | PAGES |
|---|---|---|
| 01000 | GENERAL CONDITIONS | 1-55 |
| .01 | Abbreviations and Definitions | 1-6 |
| .02 | Time for Submittal of Bonds | 6 |
| .03 | Performance Bond | 6 |
| .04 | Payment Bond | 6 |
| .05 | Responsibility for Loss | 6-7 |
| .06 | Prevailing Wages | 7-9 |
| .07 | Wage and Earning Assignment Orders/ Notices of Assignments | 9 |
| .08 | Working Hours | 9 |
| .09 | Apprentice Utilization on Public Works | 10 |
| .10 | Non-Discrimination Provisions | 10 |
| .11 | Board Right to Terminate Contract | 10-11 |
| .12 | Assignments | 11 |
| .13 | Cancellation for Default | 12-13 |
| .14 | Other Contracts | 13-14 |
| .15 | Contract Documents Complementary | 14 |
| .16 | Precedence of Documents | 14-15 |
| .17 | Standard Specifications | 15 |
| .18 | Reference Specifications | 15 |
| .19 | Electronic Copies of Contract Documents Furnished | 15 |
| .20 | Responsibility of Costs and Materials | 16 |
| .21 | Shop Drawings and Materials Samples | 16-17 |
| .22 | Source Inspections and Samples for Testing | 17-18 |
| .23 | Defective Materials and Construction | 19 |
| .24 | Protection of Materials | 19 |
| .25 | Authority of Engineer | 20 |
| .26 | Subsurface Data and Physical Conditions | 20-21 |
| .27 | Protection of Existing Utilities | 21 |
| .28 | Harbor Datum | 22 |
| .29 | Surveying and Staking | 22 |
| .30 | Inspection of Work | 23 |
| .31 | Field Office Trailer and Field Personnel | 23 |
| .32 | Character of Workers and Discipline Among Employees | 24 |
| .33 | Changes in Work | 24 |
| .34 | Cost-Plus Change Order Work (Change Orders) | 25-28 |
| .35 | Authority for Adjustments | 28-30 |
| .36 | Force Account Work | 30 |
| .37 | Request for Additional Compensation | 31 |
| .38 | Emergency Work | 31 |
| .39 | Temporary Suspension of Work | 32 |
| .40 | Unauthorized Work | 32 |
| .41 | Contractor to Abide by Applicable Laws | 32 |
| .42 | Explosives | 33 |
| .43 | Proprietary Names and Substitutions | 33-34 |

TABLE OF CONTENTS
BIDDING REQUIREMENTS


| SECTION | TITLE | PAGES |
|---|---|---|
| .44 | Patent Rights | 34 |
| .45 | Housekeeping and Maintenance of Surface Areas of Project Site and any Laydown Area(s) | 34-35 |
| .46 | Protection of Harbor Waters | 35 |
| .47 | Project Site and any Laydown Area(s) Security | 35 |
| .48 | Public Convenience and Protection | 35-36 |
| .49 | Temporary Utilities | 36 |
| .50 | Sanitation | 36 |
| .51 | Railroad Tracks | 36 |
| .52 | Construction Schedule | 37 |
| .53 | Extensions of Time and Compensable Delays | 37-39 |
| .54 | Liquidated Damages | 39-40 |
| .55 | Partial Acceptance and Use | 40-41 |
| .56 | Partial Payments | 41-44 |
| .57 | Acceptance and Final Payment | 44-45 |
| .58 | Affidavit of Completion | 45 |
| .59 | Guarantee | 46 |
| .60 | No Personal Liability | 46 |
| .61 | No Estoppel | 47 |
| .62 | Potentially Significant Cultural Material | 47 |
| .63 | State Tidelands Grant | 47 |
| .64 | Responsibility for Subcontractors | 48 |
| .65 | Contractor's Liability for Hazardous Wastes or Hazardous Substances | 48 |
| .66 | Time and Materials Form | 49 |
| .67 | Daily Field Report | 50 |
| .68 | Laydown Area(s) | 51-55 |
| 01000A | SUPPLEMENTARY CONDITIONS | 1-5 |

TABLE OF CONTENTS
BIDDING REQUIREMENTS


| SECTION | TITLE | PAGES |
|---|---|---|
| | DIVISION 01 - GENERAL REQUIREMENTS | |
| 01 11 00 | Summary of Work | 1-2 |
| 01 14 13 | Location and Access | 1 |
| 01 14 19 | Site Conditions | 1-3 |
| 01 31 13 | Coordination | 1-8 |
| 01 31 25 | Internet–Based Project Management | 1-2 |
| 01 32 16 | Construction Schedules | 1-19 |
| 01 32 24 | Surveying and Field Engineering | 1-5 |
| 01 32 33 | Photographic Documentation | 1-5 |
| 01 32 35 | Panoramic Photographic Documentation | 1-6 |
| 01 35 43 | Environmental Construction Requirements | 1-7 |
| 01 41 00 | Regulatory Requirements | 1-17 |
| 01 52 14 | Field Offices | 1-12 |
| 01 57 50 | Temporary Barrier Rail | 1 |
| 01 74 20 | Construction and Demolition Waste Management | 1-10 |
| 01 78 39 | Project Record Documents | 1-3 |
| | DIVISION 02 – EXISTING CONDITIONS | |
| 02 00 01 | Basic Site Materials and Methods | 1-6 |
| 02 41 13 | Selective Site Demolition | 1-5 |
| 02 61 14 | Excavating, Stockpiling, and Disposing of Chemically Impacted Soil | 1-18 |
| | DIVISION 03 – CONCRETE | |
| 03 10 00 | Concrete Forming and Accessories | 1-5 |
| 03 20 00 | Concrete Reinforcing | 1-6 |
| 03 34 00 | Lightweight Aggregate Fill | 1-5 |
| 03 35 43 | Polished Concrete Finishing | 1-5 |
| 03 45 00 | Precast Architectural Concrete | 1-7 |
| | DIVISION 04 – MASONRY | |
| 04 22 00 | Concrete Unit Masonry | 1-9 |
| 04 22 23 | Architectural Concrete Masonry | 1-17 |

| SECTION | TITLE | PAGES |
|---|---|---|
| | DIVISION 05 – METALS | |
| 05 05 13 | Shop-Applied Coatings for Metals | 1-5 |
| 05 05 14 | Treating Damaged Galvanizing | 1-2 |
| 05 05 24 | Structural Welding | 1-12 |
| 05 12 02 | Structural Steel | 1-18 |
| 05 12 24 | Structural Steel Tests and Inspections | 1-4 |
| 05 50 00 | Metal Fabrications | 1-19 |
| 05 52 03 | Guardrails | 1-12 |
| 05 73 01 | Stainless Steel Handrails | 1-7 |
| | DIVISIONS 06 – WOOD, PLASTICS, AND COMPOSITES | |
| 06 10 00 | Rough Carpentry | 1-8 |
| | DIVISION 07 – THERMAL AND MOISTURE PROTECTION | |
| 07 14 16 | Cold Fluid-Applied Waterproofing | 1-10 |
| 07 19 00 | Water Repellents | 1-5 |
| 07 27 01 | Gypsum Board Weather-Resistant Barrier and Air Barrier System | 1-11 |
| 07 41 13 | Metal Roof Panels | 1-13 |
| 07 46 25 | Wood Rainscreen Siding | 1-8 |
| 07 60 00 | Flashing and Sheet Metal | 1-5 |
| 07 92 00 | Joint Sealants | 1-4 |
| | DIVISION 08 – OPENINGS | |
| 08 11 13 | Hollow Metal Doors and Frames | 1-9 |
| 08 62 23 | Tubular Daylighting Devices | 1-13 |
| 08 71 00 | Door Hardware | 1-8 |

SECTION TITLE PAGES

DIVISION 09 – FINISHES

09 22 16 Non-Structural Metal Framing....1-7
09 30 50 Tile and Stone Setting Materials and Accessories....1-4
09 65 00 Resilient Flooring....1-6
09 90 01 Painting for Exterior Improvements....1-6
09 96 00 High-Performance Coatings....1-11
09 96 20 Corrosion Control....1-4
09 96 23 Graffiti-Resistant Coatings....1-4

DIVISION 10 – SPECIALTIES

10 14 00 Signage....1-20
10 28 13 Toilet Accessories....1-4
10 44 14 Fire Extinguishers and Cabinets....1-3

DIVISION 11 – EQUIPMENT

11 68 13 Playground Equipment....1-20

DIVISION 12 – FURNISHINGS

12 93 01 Site Furnishings....1-15

DIVISIONS 13 THROUGH 21 – NOT USED

DIVISION 22 – PLUMBING

22 00 00 Plumbing....1-23

DIVISION 23 – HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

23 05 29 Hangers and Supports for HVAC Piping and Equipment....1-9
23 05 48 Vibration and Seismic Controls for HVAC....1-11
23 05 53 Identification for HVAC Piping and Equipment....1-5
23 05 93 Testing, Adjusting, and Balancing for HVAC....1-15
23 81 26.13 Small-Capacity Split-System Air-Conditioners....1-7

SECTION TITLE PAGES

DIVISIONS 24 THROUGH 25 – NOT USED

DIVISION 26 – ELECTRICAL

26 00 01 Basic Electrical Materials and Methods ....1-8
26 01 27 Field Tests ....1-3
26 05 19 Low-Voltage Electrical Power Conductors and Cables ....1-14
26 05 21 600 Volt or Less Rated Wiring System ....1-4
26 05 26 Grounding and Bonding for Electrical Systems....1-4
26 05 29 Hangers and Supports for Electrical Systems....1-9
26 05 33 Raceways and Boxes for Electrical Systems ....1-9
26 05 34 Outlet, Junction, and Pull Boxes ....1-2
26 05 35 Concrete Pull Boxes ....1-3
26 05 37 Maintenance Holes and Handholes ....1-6
26 05 41 Rigid Galvanized Steel Conduit ....1-4
26 05 42 PVC Conduit ....1-3
26 05 45 Underground Electrical Work ....1-8
26 05 53 Identification for Electrical Systems ....1-4
26 05 70 Electrical System Analysis ....1-11
26 05 75 Electrical Backboard ....1-2
26 08 02 Electrical Systems and Products Manufacturer's Certification, Quality Assurance, and Warranty Verification....1-8
26 09 23 Lighting Control Devices ....1-13
26 12 12 Transformers ....1-2
26 24 14 Low-Voltage Switchboard ....1-7
26 24 16 Panelboards....1-4
26 27 14 Electricity Meter ....1
26 27 26 Wiring Devices ....1-7
26 43 00 Surge Protective Devices....1-3
26 50 00 Lighting ....1-5
26 51 13 Interior Luminaires ....1-3
26 56 15 Wooden Poles ....1-2
26 56 29 Site Lighting ....1-15

DIVISION 27 – COMMUNICATIONS

27 05 43 Underground Ducts and Raceways for Communication Systems....1-10
27 11 16 Communication Cabinets, Racks, Frames, and Enclosures ....1-7
27 13 23 Communications Optical Fiber Backbone Cabling....1-14
27 21 33 Data Communications Wireless Access Points ....1-23
27 32 26 Ring-Down Emergency Telephones ....1-7

SECTION TITLE PAGES

DIVISION 28 – ELECTRICITY SAFETY AND SECURITY

28 05 07.23 Uninterruptible Power Supply .....1-16
28 13 19 Digital Video Recorders and Supervisory Interfaces.....1-25
28 20 00 Video Surveillance .....1-51
28 31 22 Electronic Safety Alert.....1-17

DIVISIONS 29 THROUGH 30 – NOT USED

DIVISION 31 – EARTHWORK

31 00 00 Earthwork.....1-15
31 05 20 Filter Fabric.....1
31 05 22 Multi-Axial Geogrid .....1-4
31 09 12 Geotechnical Instrumentation and Post Construction Investigations.....1-18
31 21 17 Methane Mitigation Systems.....1-20
31 23 19 Dewatering.....1-2
31 23 33 Trenching and Backfilling.....1-5
31 25 15 Dust and Erosion Control Agent .....1-2
31 50 01 Excavation Safety Requirements.....1-2
31 62 13.23 Prestressed Concrete Piles .....1-45
31 62 14 Concrete Indicator Pile Testing.....1-16

SECTION TITLE PAGES

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 01 91 Plant Establishment, Maintenance, and Site Care....1-14
32 10 01 Site Paving and Surfacing....1-9
32 11 24 Crushed Miscellaneous Base....1-4
32 12 17 Asphalt Concrete Paving....1-8
32 13 14 Concrete for Exterior Improvements....1-14
32 13 15 Architectural Cast-In-Place Concrete....1-15
32 14 13 Precast Concrete Unit Paving....1-5
32 17 13 Parking Bumpers....1-2
32 17 23 Pavement Markings....1-6
32 18 16.13 Playground Protective Surfacing....1-10
32 31 13 Chain Link Fences and Gates....1-19
32 31 19 Decorative Metal Fences and Gates....1-3
32 84 00 Planting Irrigation....1-22
32 90 01 Planting and Landscaping....1-20
32 91 01 Planting Soil and Preparation....1-11
32 93 53 Palm Trees....1-11

DIVISION 33 – UTILITIES

33 05 97.16 Markers for Utility Identification....1-2
33 05 97.23 Underground Utility Warning Tape....1-2
33 10 01 Water Distribution....1-8
33 30 00 Sanitary Sewerage....1-3
33 40 01 Storm Drainage....1-8

DIVISION 34 – TRANSPORTATION

34 41 13 Traffic Signals....1-4
34 41 14 Traffic Control....1-8
34 41 24 Street Lighting....1-9
34 71 19.16 Flexible Vehicle Delineators....1

DIVISIONS 35 THROUGH 48 – NOT USED

SECTION TITLE PAGES

Appendix “A”

Project Labor Agreement (PLA) and POLA Construction Careers Policy

Appendix “B”

Railroad Flagging Agreement, Flagging Policy, and Rate Schedule

Appendix “C”

Mitigation Measures, Monitoring, and Reporting

Appendix “D”

Environmental Compliance Tracking (ECT) Form

Appendix “E”

Waste Management Plan (WMP) and Solid Waste Diversion and Disposal (SWDD) Report Forms

Appendix “F”

Electrical Safety Policy – Implementation Plan

Appendix “G”

Los Angeles Harbor Department Import Material Checklist

Appendix “H”

Bridge and Sundial Special Provisions

Appendix “I”

Pipeline Test Report

Appendix “J”

LADWP Electrical Commitment Drawings

Appendix “K”

Department LAXT Source Site

01 The HARBOR DEPARTMENT of the CITY OF LOS ANGELES, California, invites electronic bids in accordance with Specification No. 2804A for AVALON PEDESTRIAN BRIDGE AND PROMENADE GATEWAY.

02 Project consists of construction of concrete cable supported pedestrian bridge and promenade gateway in accordance with Drawing Nos. 1-3302A and 1-3472A. Work includes but is not limited to installation of prestressed concrete pile foundations, retaining wall, architectural features and finishes, site demolition and removals, grading, surcharge, landscaping, hardscaping, construction of a restroom, lighting, striping, signage, parking lots, and play areas.

03 Contract Documents are available in Department's Web-based Bid Management System called "Construction Division Business Opportunity Network (CDBON)" utilizing an online bid management system at https://www.portoflosangeles.org/business/contracting-opportunities/construction-bids. Bidders shall be required to register to download Drawings, Specifications, Addenda, and other important documents. A plan holders list can be accessed without registering. For information concerning bids, call the Department at (310) 732-3522.

04 A virtual pre-bid conference shall be held on December 10, 2025 at 9 a.m. via Microsoft Teams. Please RSVP to Karen Gong if you plan to attend. The agenda and related materials shall be posted to CDBON and shall be discussed in detail at the meeting.

05 Bids must be submitted online via Port Of Los Angeles CDBON system on or before 2:45 p.m. (PST/PDT) on December 22, 2025 at which time, bid results shall be available for viewing.

06 Each bid must be accompanied by a scanned copy of the following: a check certified by a responsible financial institution, or a cashier's check issued by a responsible financial institution, or by a satisfactory bid bond, payable to the order of City of Los Angeles Harbor Department, for an amount not less than 10 percent of the aggregate sum of the bid, as a guarantee that Bidder shall enter into Contract if awarded, and furnish the required bonds. Bid bond shall be placed with insurance carriers which are rated VII, A- or better in Best's Insurance Guide. If a Best's Insurance Guide rating is not available, then the proposed carrier must meet comparable standards in another rating service satisfactory to City.

07 The provisions of Sections 10.8 through 10.11 and 10.13 of Los Angeles Administrative Code pertaining to nondiscrimination and affirmative action shall be a part of said Contract. Portions of these provisions are summarized in Subsections 00030.03 and 00030.04 of BIDDING DOCUMENTS Section which set forth requirements Bidder must acknowledge.

08 City of Los Angeles Harbor Department is committed to creating an environment that provides all individuals and businesses open access to the business opportunities available at Port of Los Angeles in a manner that reflects the diversity of City of Los Angeles. Port of Los Angeles Small Business Enterprise Program (SBEP or "Program") as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section was created to provide additional opportunities for small businesses to participate in any and all contracts. It has been determined that based on Work to be performed in Contract, Small Business Enterprise participation shall be a minimum of 16%, of which 4% shall be Very Small Business Enterprise participation.

09 The first 3 apparent low Bidders shall submit the following documents with original signatures within 3 Business Days after bids are closed or as otherwise stated below. Information from other Bidders shall be requested only if they are being considered for an Award of Contract. Other Bidders shall submit this information within 3 Business Days of receiving a written request from Engineer.

a Original of a check certified by a responsible financial institution, or a cashier's check, or bid bond in conformance with subsection 6 above.

b Affidavit of Noncollusion.

c Contractor/Subcontractor/Supplier Information Form, refer to Subsection 00660.01.

d Subcontractor/Supplier Ownership Affidavit for each listed subcontractor and supplier, refer to Subsection 00660.02.

e Electrical Safety Policy form.

f CEC Form 50, prime contractor's certification.

g CEC Form 55 with subcontractor's and principals of subcontractor's information (if subcontractor and principal of subcontractor information were not submitted at time of bid). Failure to submit the information within 3 Business Days after bids are closed or within 3 Business Days after receiving written request from Engineer may be cause in Engineer's discretion to deem bid nonresponsive if Bidder does not promptly correct the failure upon written request of Engineer. Refer to BIDDING DOCUMENTS Section, Subsection 00030.07, Contract Solicitations Charter Section 470 (c) (12) Subsection, Paragraph C.

h Bidders, subcontractors, and suppliers identified in the bid submittal as SBE or VSBE must be certified at time of bid, as applicable. Bidders, subcontractors, and suppliers must submit a copy of SBE certificate or VSBE certificate from the agency utilized to obtain certification as SBE or as VSBE to Engineer within 3 Business Days of close of bids in order to be acknowledged within the bid as SBE or VSBE. Refer to https://kentico.portoflosangeles.org/getmedia/aea536e1-5d48-440a-8857-c55907e3dc74/contracting-proprietary-sbe-cert-application for certification instructions.

10 At time of bid, Bidders must be registered on City's Contracts Management and Opportunities Database, Regional Alliance Marketplace for Procurement (RAMP) – a free service provided by the Mayor's Office of Economic Development and the Minority Business Opportunity Committee. RAMP is accessible at https://www.rampla.org/s/.

11 Within 4 Calendar Days after close of bids, subcontractors and suppliers must be registered on RAMP. In addition, within 4 Calendar Days after close of bids, Bidders, subcontractors, and suppliers identified in the bid submittals as SBE or VSBE must be verified on RAMP as SBE (Proprietary) or VSBE (Harbor), as applicable.

Bidders, subcontractors, and suppliers are advised that there is an application process required to become certified as SBE (Proprietary) and as VSBE (Harbor), and that time is of the essence.

12 Contract may be awarded at any time during a period of 90 Calendar Days after date of close of bids. The right is reserved to reject any and all bids.

13 At the time of Award, the successful Bidder shall possess an active Class A California Contractor's License at the time of Award and subcontractors shall possess active, applicable licenses necessary to perform Work that corresponds to the description of Work as provided in CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION Section.

14 The successful Bidder shall sign Section 5.1 Signatures of CONTRACT Section within 2 Calendar Days after Notice of Intent to Award.

15 The successful Bidder shall, within 14 Calendar Days after Notice of Award, provide acceptable bonds and insurance on the forms provided as required in CONTRACT Section and GENERAL CONDITIONS Section.

16 A performance bond in the amount of the full Contract price shall be provided. A payment bond in the amount of 100 percent of Contract price shall also be provided in case of an award in excess of $25,000. Performance bond and payment bond shall be placed with insurance carriers which are rated VII, A- or better in Best's Insurance Guide. If a Best's Insurance Guide rating is not available, then the proposed carrier must meet comparable standards in another rating service satisfactory to City. Bidders may be eligible for participation in City's Bond Assistance Program referenced in Subsection 00022.18.

17 The prevailing rate of per diem wages and rates for legal holidays and overtime work for each craft, classification or type of workers needed in the execution of any contract to let under Specifications has been determined by the Director of the Department of Industrial Relations of the State of California pursuant to the provisions of the Labor Code of the State of California. Copies of the applicable Determinations by the said Director are on file in Construction Division and are hereby incorporated and made a part hereof as though the same were fully set forth in this Section. The State of California has approved City's Labor Compliance Program of enforcement of State prevailing wage laws and shall allow City to retain all penalty assessments for violation of these laws.

18 Pursuant to notice requirements effective January 1, 2015, all contractors and subcontractors must register with and meet requirements of the State of California Department of Industrial Relations using the online application before bidding on public works contracts in California. For the online application, visit http://www.dir.ca.gov/Public-Works/PublicWorks.html.

a No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 (with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1[a]).

b No contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

c Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

19 In accordance with Board of Harbor Commissioners' Resolution No. 6315, Electrical Safety Policy, adopted October 27, 2004, the successful Bidder shall comply with the required qualifications for jobsite workers, as specified in BASIC ELECTRICAL MATERIALS AND METHODS Section (PART 1, Quality Assurance Article, Paragraph B, Jobsite Workers and subparagraphs).

20 Board of Harbor Commissioners of City of Los Angeles adopted Resolution No. 6328 on January 12, 2005, agreeing to adopt the provisions of Los Angeles City Ordinance 172,908, as amended, relating to Equal Benefits (Section 10.8.2.1. et seq. of Los Angeles Administrative Code) as a policy of Harbor Department. Contractor shall comply with the policy detailed in Subsection 00030.05 Equal Benefits Ordinance Compliance Affidavit of BIDDING DOCUMENTS Section.

21 Build America, Buy America Requirements: City of Los Angeles Harbor Department shall enforce Build America, Buy America requirement provisions included in BIDDING DOCUMENTS Section of Specifications.

22 In accordance with Board of Harbor Commissioners' Resolution No. 17-8164, Approval of Port-Wide Project Labor Agreement (PLA), adopted September 7, 2017, and in accordance with Board of Harbor Commissioners' Resolution Nos. 18-8319 and 18-8320, approval of Construction Careers Policy, adopted July 17, 2018, included as Appendix "A" of Specifications, Contractor and all subcontractors, prior to start of Work, shall sign a Letter of Assent (Attachment A of Appendix "A") agreeing to the terms of PLA. Contractor shall further comply with the terms of Attachment "B" (Drug and Alcohol Testing Policy) and fill out Attachment "C" (Request/Verification for Craft Employees) during the course of Project.

23 Harbor Department strives to work cooperatively with Contractor through partnering. Refer to SUPPLEMENTARY CONDITIONS Section for partnering language and requirements.

24 Iran Contracting Act of 2010: Harbor Department shall enforce Iran Contracting Act of 2010 requirement provisions included as Subsection 00030.08 of BIDDING DOCUMENTS Section of Specifications. Bidder shall fill out and submit at time of bid Iran Contracting Act of 2010 Compliance Affidavit included as Subsection 00030.9 of BIDDING DOCUMENTS Section of Specifications.

25 Project is state funded by the Port and Freight Infrastructure Program (PFIP) through California State Transportation Agency (CalSTA) (Senate Bill 198 (SB 198; Section 13 of Chapter 71, Statutes of 2022)), locally funded by the Los Angeles County Metropolitan Transportation Authority (LACMTA) through Measure R, and federally funded with U.S. Department of Transportation (USDOT) funds by the Reconnecting Communities and Neighborhoods Grant Program (RCN). To comply with funding, requirements are incorporated in Specifications.

26 Since this Project has state and federal funding, it is exempt from Local Business Preference Program and no preference shall apply.

EUGENE D. SEROKA
Executive Director

Dated December 2, 2025

01 GENERAL

a Information in this Section supplements or further explains information in NOTICE INVITING BIDS Section.

02 FORM OF PROPOSAL

a Bids shall be tendered online via CDBON, in conformance with Subsection 00012.03 of NOTICE INVITING BIDS Section.

b All required fields in Bid Proposal Line Items shall be filled in on the forms provided online.

c All documents listed in Subsection 00022.21, “Bidder’s Check List”, shall be submitted in conformance with the instructions provided in Subsection 00022.21.

03 PROPOSAL IRREGULARITIES AND ALTERATIONS

a Bidders are prohibited from altering BIDDING DOCUMENTS Section. Any alterations or changes made to BIDDING DOCUMENTS Section shall render the bid informal and subject to rejection.

04 PROPOSAL SIGNATURE(S)

a If the bid is made by an individual, the signature must be the full name of Bidder, whose address must be given.

b If the bid is made by a partnership, it must be signed by each partner or accompanied by proof that the persons signing the bid are authorized to bind the partnership. The name and address of the partnership and the address of the persons signing must be provided.

c If the bid is made by a corporation, it must be signed by a person authorized to do so by bylaw or resolution of that corporation.

d A corporation submitting a bid may be required, before Contract is finally awarded, to furnish a certificate as to its corporate existence, and satisfactory evidence as to the officers or officer authorized to execute the bid on behalf of the corporation.

05 PROPOSAL GUARANTY

a The bid shall be accompanied by a scanned copy of the following documents: A certified check or a cashier's check issued by a responsible financial institution, payable to the order of City of Los Angeles Harbor Department, or by a satisfactory bid bond, for an amount equal to at least 10 percent of the total amount of the bid, as a guaranty that the Bidder shall enter into Contract with City and furnish all required bonds for Work contemplated. The originals shall be submitted with the documents listed in Subsection 00012.09 of NOTICE INVITING BIDS Section.

b If a certified or cashier's check is tendered as a proposal guaranty, Bid Bond form may be disregarded. In all other instances, the bond form provided with BIDDING DOCUMENTS Section shall be signed by the Bidder and its surety(ies).

c Upon execution of Contract and provision of the necessary bond(s) and insurance by the successful Bidder, the check or the amounts thereof and the bonds of the unsuccessful Bidders shall be returned or released.

06 AFFIDAVIT OF NONCOLLUSION

a Affidavit of Noncollusion form provided with BIDDING DOCUMENTS Section, properly executed, a scanned copy must be submitted with the bid. The signature on the affidavit must be subscribed and sworn to before a notary public.

b Any bid made without such affidavit, shall not be considered. Any Bidder making a false affidavit may be excluded from future bidding on contracts with City.

c If at any time it is found that the person, firm, or corporation, to whom Award of Contract has been made, did, in submitting the bid, collude with any other party or parties, then Contract shall be voided. Work shall be re-advertised. Contractor and Contractor's bondspersons shall be held liable to City for all loss or damage which it may suffer thereby.

d The original shall be submitted with the documents listed in Specifications as Subsection 00012.09 of NOTICE INVITING BIDS Section.

07 FEDERAL EXCISE TAX

a Prices quoted by Bidder shall be exclusive of federal excise taxes pursuant to exemption of political subdivisions of a State under federal law.

b City, when requested, shall furnish Contractor a Certificate of Exemption from federal excise tax covering materials and equipment to be furnished pursuant to Specifications.

08 RETAIL SALES OR USE TAX

a Purchases under Specifications are subject to the full application of California State and Los Angeles City and County sales or use tax.

b Prices quoted in BIDDING DOCUMENTS Section shall be construed as including all applicable taxes regardless of whether or not sales or use tax is stated separately by Bidder.

09 DUTIES

a Prices quoted by Bidder shall include all applicable duties, including import duties.

10 WITHDRAWAL OF BID

a A Bidder may withdraw a bid, without prejudice, at any time prior to bid closing. The Withdraw button on the CDBON online system shall become available from the time a bid is submitted to any time prior to the close of bids.

11 INTERPRETATIONS AND ADDENDA

a Should a prospective Bidder find discrepancies in or omissions from Specifications or other Contract Documents, or should there be doubt as to their intended meaning, Bidder may submit to Engineer a written request for an interpretation and clarification. Bidder submitting the request is responsible for the prompt delivery and timeliness of any such request.

b Any interpretation of or change in Contract Documents shall be made only by addendum issued to each person or entity to whom Specifications have been issued, and shall become a part of any contract awarded. City shall not be responsible for any oral or other explanations or interpretations. Receipt of any such addenda by Bidder must be acknowledged on Proposal form in the space provided.

12 BIDDERS TO INVESTIGATE

a Bidder's submittal of a bid constitutes its acknowledgement that Bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality and quantities of Work to be performed and materials to be furnished, and as to the requirements of Specifications. The submission of the bid shall constitute prima facie evidence that Bidder has made such examination.

13 EXISTING INFORMATION

a Engineer shall make available to all prospective Bidders, prior to the receipt of bids, all information in possession of Department as to subsoil conditions in the vicinity of Work, topographical maps, or other information that might assist Bidder in properly evaluating the amount and character of Work that may be required. Any additional subsurface exploration shall be done at Bidder's sole cost and expense.

14 SUBCONTRACTS

a Section 10.14 (as amended) of Los Angeles Administrative Code requires each Bidder to submit with the bid the names and addresses of subcontractors whose Work shall be in excess of one-half of 1 percent of Bidder's total bid or $10,000, whichever is greater, and shall indicate that portion of Work which shall be done by each subcontractor so listed. The successful Bidder shall make no substitutions of subcontractors so listed except as provided for in said ordinance. For the purpose of this Article, the terms and definitions of Section 10.14 (as amended) of Los Angeles Administrative Code shall apply. The requirements for Bidder's list of subcontractors specified herein are separate from and supplementary to the requirements set forth in Subsection 00030.07 of BIDDING DOCUMENTS Section. Bidder shall complete City Ethics Commission (CEC) Form 55, including identifying subcontractors performing Work valued at $100,000 or more on Contract, as well as the principals of said subcontractors, irrespective of whether the aforementioned subcontractors' Work exceeds on-half of one percent (0.5%) of Bidder's total bid.

b Not more than 65 percent of the monetary value of Work shall be subcontracted. The listing of more than 65 percent may result in the rejection of the bid.

c Bidder shall be fully responsible to City for its acts and/or omissions and for the acts and/or omissions of persons directly employed by the Bidder. Additionally, Bidder shall be fully responsible to City for the acts and/or omissions of subcontractors and of persons or entities either directly or indirectly employed by subcontractors. Nothing contained in Contract Documents shall create or be construed as creating a contractual relationship between any subcontractor of Bidder and City.

d Each Bidder must complete, sign, notarize, and submit as part of the bid Contractor Ownership / RAMP Outreach Affidavit included in Specifications as Subsection 00030.11 of BIDDING DOCUMENTS Section. Each Bidder shall also submit with the bid the subcontractor list entered online as provided on CDBON.

00022.14 Cont'd.

e Failure of Bidder to specify a subcontractor for any portion of Work or specifying a subcontractor that does not possess active, applicable licenses necessary to perform Work that corresponds to the description of Work provided in CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION Section shall constitute agreement by said Bidder that it is fully qualified to perform that Work and shall perform with its own forces.

15 MANDATORY PROVISIONS PERTAINING TO NON-DISCRIMINATION IN EMPLOYMENT

Unless otherwise exempt, this Contract is subject to the applicable non-discrimination, equal benefits, equal employment practices, and affirmative action program provisions in Los Angeles Administrative Code (LACC) Section 10.8 et seq., as amended from time to time.

a Contractor shall comply with the applicable non-discrimination and affirmative action provisions of the laws of the United States of America, the State of California, and City. In performing this Contract, Contractor shall not discriminate in any of its hiring or employment practices against any employee or applicant for employment because of such person's race, color, religion, national origin, ancestry, sex, sexual orientation, gender, gender identity, age, disability, domestic partner status, marital status or medical condition.

b The requirements of Section 10.8.2.1 of the LAAC, the Equal Benefits Ordinance, and the provisions of Section 10.8.2.1(f) are incorporated and made a part of this Contract by reference.

c The provisions of Section 10.8.3 of the LAAC are incorporated and made a part of this Contract by reference and shall be known as the "Equal Employment Practices" provisions of this Contract.

d The provisions of Section 10.8.4 of the LAAC are incorporated and made a part of this Contract by reference and shall be known as the "Affirmative Action Program" provisions of this Contract.

16 SMALL, VERY SMALL, MINORITY, WOMEN, DISABLED VETERAN, AND OTHER BUSINESS ENTERPRISE (SBE/VSBE/MBE/WBE/DVBE/OBE)

a It is the policy of City of Los Angeles to provide Small Business Enterprises (SBE) and Very Small Business Enterprises (VSBE), including Minority Business Enterprises (MBEs), Women Business Enterprises (WBEs), Disabled Veteran Business Enterprise (DVBE), and Other Business Enterprises (OBEs) an equal opportunity to participate in the provision of goods and services under Contract. Department strongly encourages Contractor to include MBE, WBE, and DVBE participation to the fullest extent possible.

b To be eligible for an award of contract, each Bidder shall complete, sign, notarize, and submit as part of the bid Contractor Ownership / RAMP Outreach Affidavit included in Specifications as Subsection 00030.11 of BIDDING DOCUMENTS Section.

c As part of the bid, each Bidder shall complete and submit subcontractor list in CDBON. As part of the bid, each Bidder shall complete and upload into CDBON the Supplier List in Subsection 00660.03 of CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION Section listing suppliers necessary to meet SBE/VSBE participation requirements in conformance with Subsection 00030.06 of BIDDING DOCUMENTS Section.

d Within 3 Business Days after bids are closed, each Bidder shall submit Contractor/Subcontractor/Supplier Information Form included in Specifications as Subsection 00660.01 of CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION Section for prime contractor and subcontractors. Submit Contractor/Subcontractor/Supplier Information Form included in Specifications as Subsection 00660.01 of CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION Section for supplier necessary to meet SBE/VSBE participation requirements in conformance with Subsection 00030.06 of BIDDING DOCUMENT Section.

e Contractor Ownership / RAMP Outreach Affidavit and Contractor/Subcontractor/Supplier Information Form when signed, shall signify Bidder’s intent to comply with Small Business Enterprise Program described in Specifications.

f In accordance with Section 4104 of the Public Contracting Code of the State of California, as amended, information is required to be entered in CDBON for each subcontractor who shall perform Work (including Contingency and Allowance Item Work) amounting to more than one half of one percent (0.5%) of the Total Base Bid or $10,000 (whichever is greater).

## 17 AWARD OF CONTRACT

a Award of Contract shall be in accordance with the provisions of this Subsection.

1 Award of Contract, if award is to be made, shall be to the lowest and best regular, responsible Bidder furnishing satisfactory security for its performance and complying with Small Business Requirement.

2 The right is reserved to reject any and all bids, or to reject any item or items therein and to waive any informality in the bid.

3 Upon receipt of Notice of Intent to Award, the successful Bidder shall sign in designated area of Section 5.1 of CONTRACT Section.

b Bidder to be awarded Contract must be capable of performing the various items of Work bid upon. Bidders may be required to submit, before Award of Contract, satisfactory evidence covering experience on similar Work, a list of machinery, plant, and other equipment available for the proposed Work, and such statements of their financial resources as may be deemed necessary. If the available evidence of competency of any Bidder is not satisfactory, the bid of such Bidder shall be rejected.

c City may reject bids which have prices shown on Bid Proposal Line Items that are obviously unbalanced.

d The bid of any party who has been delinquent or unfaithful in the performance of any former contract with City may be rejected.

## 18 BOND ASSISTANCE PROGRAM

a The Bond Assistance Program (BAP) is designed to assist small, local, minority, women, and disadvantaged businesses in removing potential barriers of surety bonding by providing technical, administrative assistance, and other resources to these companies. For information on BAP, please contact Tricia Carey at (310) 732-7656 or email tcarey@portla.org.

19 RELEASE OF PUBLIC RECORDS

a City seeks to conduct its business publicly. The law generally provides that information given to City is a public record. In limited circumstances, information such as trade secrets and certain financial data may be treated confidentially. Bidder should be aware that the information provided to City may be available for public review. Therefore, information which Bidder desires to retain as confidential should not be produced unless expressly requested by City. If City receives a request to produce such information, it shall notify Bidder of such request. If Bidder instructs that the information not be released, City shall withhold the information provided Bidder expeditiously seeks and successfully obtains a court protective order to prevent such a release.

20 BUSINESS TAX

a In accordance with City of Los Angeles Municipal Code, a Business Tax Registration Certificate (BTRC) must be obtained and a business tax must be paid by every person engaged in business as a contractor in City of Los Angeles. Contractor shall obtain a BTRC number and pay tax due to City of Los Angeles Office of Finance, (844) 663-4411. BTRC number must be clearly shown on all invoices submitted for payment.

21 BIDDERS CHECK LIST

a Bidders may use the following checklist to verify BIDDING DOCUMENTS Section has been completed.

b Please check under the appropriate column:
*Upload: Complete included document, attach supporting documents as indicated, scan, and upload to the CDBON online system. Hard copies are to be submitted within 3 Business Days of bid closing.
**Online: Enter information directly into online form in the CDBON online system.

| | | Upload* | Online** |
|---|---|---|---|
| 1 | PROPOSAL GUARANTY* | | |
| (a) | Is the amount at least 10% of the total bid? | _____ | |
| (b) | If bid bond, is it properly filled in and signed by surety? | _____ | |
| (c) | If certified or cashier's check, is it enclosed with bid? | _____ | |
| 2 | AFFIDAVIT OF NONCOLLUSION* | | |
| (a) | Is affidavit properly filled in and signed? | _____ | |
| (b) | Is affidavit notarized? | _____ | |
| 3 | EQUAL BENEFITS ORDINANCE COMPLIANCE AFFIDAVIT* | | |
| (a) | Is the affidavit completed and signed? | _____ | |
| (b) | Are the forms enclosed with the bid? | _____ | |
| 4 | CONTRACT SOLICITATIONS CHARTER SECTION 470 (c) (12)* | | |
| (a) | Are City Ethics Commission (CEC) Forms 50 and 55 completed and signed? (If CEC Form 55 is submitted without subcontractor information, Bidder shall submit updated CEC Form 55 as stated in NOTICE INVITING BIDS Section.) | _____ | |
| (b) | Are the forms enclosed with the bid? | _____ | |
| 5 | IRAN CONTRACTING ACT OF 2010 COMPLIANCE AFFIDAVIT* | | |
| (a) | Is the affidavit completed and signed? | _____ | |
| (b) | Is the affidavit enclosed with the bid? | _____ | |

000022.21 Cont'd.

| | | Upload* | Online** |
|---|---|---|---|
| 6 | CONTRACTOR OWNERSHIP / RAMP OUTREACH AFFIDAVIT* | | |
| | (a) Is affidavit properly filled in and signed? | _____ | |
| | (b) Is affidavit notarized? | _____ | |
| 7 | SUBCONTRACTOR/SUPPLIER INFORMATION*/** | | |
| | (a) Has Bidder listed the name and business address of each applicable subcontractor? | | _____ |
| | (b) Has Bidder included the dollar amount in the appropriate column for each subcontractor? | | _____ |
| | (c) Has Bidder accurately described Work to be done by said subcontractor(s)? | | _____ |
| | (d) Has Bidder completed Supplier List in Subsection 00660.03? | _____ | |
| 8 | PROPOSAL**/* | | |
| | (a) Has Bidder acknowledged receipt of addendum/addenda? | | _____ |
| | (b) Is Bidder's contractor's license number and expiration date provided? | _____ | |
| | (c) Is proposal properly signed and dated? | _____ | |
| | (d) Has Bidder inserted its Tax Identification Number? | _____ | |
| | (e) Has Bidder identified the type of business and named the Partners or Corporate Officers? | _____ | |
| | (f) Has Bidder completed and signed the Headquarters Location Form? | _____ | |
| 9 | BID PROPOSAL LINE ITEMS** | | |
| | (a) Has Bidder filled in a price for each bid item? | | _____ |

END OF SECTION

01 BID BOND

*Bond portion of form need not be executed when bid is accompanied by a certified check or a cashier's check issued by a responsible financial institution.

WE, the undersigned principal and surety Zurich American Insurance Company acknowledge ourselves jointly and severally bound to City of Los Angeles, in the sum of Ten Percent of Total Bid Amoount Submitted dollars ($ 10% of Bid ) to be paid to said City if the foregoing bid shall be accepted and the proposed contract awarded to said Bidder, and said Bidder shall fail to execute Contract and furnish and execute such bond(s) as are specified in the foregoing NOTICE INVITING BIDS Section; otherwise, this obligation be void.

Dated: December 17, 2025.

Bidder's Name Skanska USA Civil West California District Inc.

By _____
James Bailey, Executive Vice President

_____

_____

(Surety) Zurich American Insurance Company

(Surety) _____
Patricia S. Arana, Attorney-In-Fact

NOTE: Surety must be in the form of a certified check, cashier's check, or a corporate surety bond. A personal surety bond is not acceptable. Annual bidder's bonds are acceptable. Cash is acceptable although not recommended.

If a check is submitted, state number _____

and amount $_____.

If an annual bid bond is used, state name of company_____

bond number _____

and unencumbered amount _____.

# ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Riverside )

On December 18, 2025 before me, Marissa D. Danbo, Notary Public
(insert name and title of the officer)

personally appeared James Bailey, Executive Vice President,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

MARISSA D. DANBO
Notary Public - California
Riverside County
Commission # 2459290
My Comm. Expires Aug 15, 2027

Signature Marissa D. Danbo (Seal)

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **Civil Code § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy or validity of that document.

State of California )
) ss
County of Los Angeles )

On Dec. 17, 2025, before me, Lisa L. Thornton, Notary Public, personally appeared Patricia S. Arana, who proved to me on the basis of satisfactory evidence to be the person~~(s)~~ whose name~~(s)~~ is~~/are~~ subscribed to the within instrument and acknowledged to me that ~~he/~~she~~/they~~ executed the same in ~~his/~~her~~/their~~ authorized capacity~~(ies)~~, and that by ~~his/~~her~~/their~~ signature~~(s)~~ on the instrument the person~~(s)~~, or the entity upon behalf of which the person~~(s)~~ acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

(Seal)

LISA L. THORNTON
Notary Public - California
Los Angeles County
Commission # 2449540
My Comm. Expires Jul 5, 2027

Signature: _____
Lisa L. Thornton, Notary Public

**ZURICH AMERICAN INSURANCE COMPANY**
**COLONIAL AMERICAN CASUALTY AND SURETY COMPANY**
**FIDELITY AND DEPOSIT COMPANY OF MARYLAND**
**POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Illinois, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Illinois (herein collectively called the "Companies"), by Christopher Nolan, Vice President, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **C.K. NAKAMURA, Lisa L. THORNTON, E.S. ALBRECHT, JR., Maria PENA, Noemi QUIROZ, Natalie K. TROFIMOFF, Patricia S. ARANA, Tim M. TOMKO of Los Angeles, California, Jessica ROSSER of Dallas, Texas,** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings,** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND,** this 1st day of August A.D. 2025.

**ATTEST:**
**ZURICH AMERICAN INSURANCE COMPANY**
**COLONIAL AMERICAN CASUALTY AND SURETY COMPANY**
**FIDELITY AND DEPOSIT COMPANY OF MARYLAND**

Colonial American Casualty and Surety Company CORPORATE SEAL
ZURICH AMERICAN INSURANCE COMPANY CORPORATE SEAL 1877 NEW YORK
Fidelity and Deposit Company of Maryland CORPORATE SEAL 1890

*By: Christopher Nolan*
*Vice President*

*By: Daniel Lutes*
*Secretary*

**State of Maryland**
**County of Baltimore**

On this 1st day of August A.D. 2025, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **Christopher Nolan, Vice President and Daniel Lutes, Secretary** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

GENEVIEVE M. MAISON NOTARY PUBLIC BALTIMORE COUNTY MD My Comm. Exp. 01/27/2029

Genevieve M. Maison
Notary Public
My Commission Expire January 27, 2029

**Authenticity of this bond can be confirmed at bondvalidator.zurichna.com or 410-559-8790**

## EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

## CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 17th day of December, 2025.

Colonial American Casualty and Surety Company CORPORATE SEAL

ZURICH AMERICAN INSURANCE COMPANY CORPORATE SEAL 1977 NEW YORK

Fidelity and Deposit Company of Maryland CORPORATE SEAL 1890

MJ Pethick

Mary Jean Pethick
Vice President

**TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT A COMPLETE DESCRIPTION OF THE CLAIM INCLUDING THE PRINCIPAL ON THE BOND, THE BOND NUMBER, AND YOUR CONTACT INFORMATION TO:**

Zurich Surety Claims
1299 Zurich Way
Schaumburg, IL 60196-1056
reportsfclaims@zurichna.com
800-626-4577

**Authenticity of this bond can be confirmed at bondvalidator.zurichna.com or 410-559-8790**

## 02 AFFIDAVIT OF NONCOLLUSION

STATE OF California
COUNTY OF Riverside
James Bailey, being first duly sworn, composes and says that Bidder is
Executive Vice President
(insert "sole owner", "partner", "president", "secretary", or other proper title) of
Skanska USA Civil West California District Inc.
(insert name of Bidder)
who submits herewith to City of Los Angeles the attached bid:

(1) That Bidder is the person whose name is signed to the hereto attached Proposal form; that said bid is genuine; that the same is not sham or collusive; that all statements of fact therein are true; that such proposal was not made in the interest of or behalf of any person, partnership, company, association, organization or corporation not therein named or disclosed.

(2) That Bidder has not directly or indirectly by agreement, communication, or conference with anyone attempted to induce action prejudicial to the interests of the public body which is to award Contract or any other bidder, or anyone else interested in the proposed Contract; that Bidder has not in any manner sought by collusion to secure an advantage over any other bidder.

(3) That prior to the date and time of deadline for bid submittal the said Bidder:

(a) did not, directly or indirectly, induce or solicit anyone else to submit a false or sham bid;

(b) did not, directly or indirectly, collude, conspire, connive or agree with anyone else that said Bidder or anyone else would submit a false or sham bid, or that anyone should refrain from bidding or withdraw bid;

(c) did not, directly or indirectly, submit the bid price entered on the attached Bid Proposal Line Items form or any breakdown thereof, or the contents thereof, or divulge information or data relative thereto, to any corporations, partnership, company, association, organization, bid depository, or to any member or agent thereof, or to any individual or group of individuals, except to the awarding authority or to any person or persons who have a partnership or other financial interest in the business of said Bidder.

Signed: J Bailey
(Title) James Bailey, Executive Vice President

Subscribed and sworn to before me

this 22 day of December, 20 25
(Seal of Notary)
Marissa D. Danbo
Signature of Notary

MARISSA D. DANBO
Notary Public - California
Riverside County
Commission # 2459290
My Comm. Expires Aug 15, 2027

## 03 MANDATORY PROVISIONS PERTAINING TO NON-DISCRIMINATION IN EMPLOYMENT

Pursuant to Los Angeles Charter and Administrative Code, Division 10 Chapter 1, Article 1, Section 10.8 et seq. it is the policy of City of Los Angeles to require each person or entity contracting for goods or services to comply with the Non-discrimination, Equal Employment practices, and Affirmative Action Program provisions of City of Los Angeles.

Sec. 10.8 Mandatory Provisions Pertaining to Non-discrimination in Employment in the Performance of City Contracts.

The City of Los Angeles, in letting and awarding contracts for the provision to it or on its behalf of goods or services of any kind or nature, intends to contract only with those contractors that comply with the non-discrimination and affirmative action provisions of the laws of the United States of America, the State of California and the City of Los Angeles. The City and each of its awarding authorities shall therefore require that any person, firm, corporation, partnership or combination thereof that contracts with the City for services, materials or supplies, shall not discriminate in any of its hiring or employment practices, shall comply with all provisions pertaining to non-discrimination in hiring and employment, and shall require Affirmative Action Programs in contracts in accordance with the provisions of this Code. The awarding authority and/or Office of Contract Compliance of the Department of Public Works shall monitor and inspect the activities of each contractor to determine that they are in compliance with the provisions of this chapter.

Although in accordance with Section 22.359 of this Code, the Board of Public Works, Office of Contract Compliance, is responsible for the administration of the City's Contract Compliance Program, accomplishing the intent of the City in contract compliance and achieving non-discrimination in contractor employment shall be the continuing responsibility of each awarding authority. Each awarding authority shall use only the rules, regulations and forms provided by the Office of Contract Compliance to monitor, inspect or investigate contractor compliance with the provisions of this chapter.

00030.03 Cont'd.

Each awarding authority shall provide immediate notification upon award of each contract by that awarding authority to the Office of Contract Compliance. Each awarding authority shall call upon the Office of Contract Compliance to review, evaluate and recommend on any contractual dispute or issue of noncompliance under the provisions of this chapter. The Office of Contract Compliance shall be notified by each awarding authority of any imminent announcement to bid, to allow the Office of Contract Compliance the opportunity to participate with the awarding authority in the monitoring, review, evaluation, investigation, audit and enforcement of the provisions of this chapter in accordance with the rules, regulations and forms promulgated to implement the City's Contract Compliance, Equal Employment Practices Program.

Sec. 10.8.1. Definitions.

Except for Section 10.8.2.1, the following definitions shall apply to the following terms used in this article:

"Awarding Authority" means any Board or Commission of the City of Los Angeles, or any authorized employee or officer of the City of Los Angeles, including the Purchasing Agent of the City of Los Angeles, who makes or enters into any contract or agreement for the provision of any goods or services of any kind or nature whatsoever for, or on behalf of, the City of Los Angeles.

"Contract" means any agreement, franchise, lease or concession, including agreements for any occasional professional or technical personal services, for the performance of any work or service, the provision of any materials or supplies, or the rendition of any service to the City of Los Angeles or to the public, which is let, awarded or entered into with, or on behalf of, the City of Los Angeles or any Awarding Authority thereof. Contracts where the provisions of this article would conflict with federal or state grant funded contracts, or conflict with the terms of the grant or subvention, as determined by the DAA, are exempt.

"Contractor" means any person, firm, corporation, partnership or any combination thereof, who enters into a contract with any Awarding Authority of the City of Los Angeles.

"Designated Administrative Agency (DAA)" means the Department of Public Works, Office of Contract Compliance created by Article X of Chapter 13 of Division 22 of the Los Angeles Administrative Code. That office is also known as the Department of Public Works, Bureau of Contract Administration.

00030.03 Cont'd.

"Domestic Partners" means, for purposes of this article, any two adults, of the same or different sex, who have registered with a governmental entity pursuant to state or local law authorizing this registration or with an internal registry maintained by an employer of at least one of the domestic partners.

"Employment Practices" means any solicitation of, or advertisement for, employees, employment, change in grade or work assignment, assignment or change in place or location of work, layoff, suspension or termination of employees, rate of pay or other form of compensation including vacation, sick and compensatory time, selection for training, including apprenticeship programs, any and all employee benefits and activities, promotion and upgrading, and any and all actions taken to discipline employees for infractions of work rules or employer requirements.

"Minority" is defined to mean "minority person" as the phrase is defined in Subsection (f) of Section 2000 of the California Public Contract Code, as amended from time to time.

"Subcontractor" means any person, firm or corporation or partnership, or any combination thereof, who enters into a contract with a Contractor to perform or provide a portion or part of any Contract with the City.

Sec. 10.8.1.1. Summary of Thresholds.

The following thresholds will be used to determine the non-discrimination and affirmative action requirements set forth in this chapter for each type of contract.

Non-discrimination Practices as outlined in Section 10.8.2 of this Code apply to all contracts.

Equal Employment Practices as outlined in Section 10.8.3 of this Code apply to all construction contracts of $1,000 or more and all non-construction contracts of $1,000 or more.

Affirmative Action Program as outlined in Sections 10.8.4 and 10.13 of this Code applies to all Construction Contracts of $25,000 or more and all non-Construction Contracts of $25,000 or more.

00030.03 Cont'd.

Sec. 10.8.2. All Contracts: Non-discrimination Clause.

Notwithstanding any other provision of any ordinance of the City of Los Angeles to the contrary, every Contract which is let, awarded or entered into with or on behalf of the City of Los Angeles, shall contain by insertion therein a provision obligating the Contractor in the performance of such Contract not to discriminate in his or her Employment Practices against any employee or applicant for employment because of the applicant's race, color, religion, national origin, ancestry, sex, sexual orientation, age, disability, marital status, domestic partner status or medical condition. All Contractors who enter into such Contracts with the City shall include a like provision in all subcontracts awarded for work to be performed under the Contract with the City. Failure of the Contractor to comply with this requirement or to obtain the compliance of its Subcontractors with such obligations shall subject the Contractor to the imposition of any and all sanctions allowed by law, including, but not limited to, termination of the Contractor's Contract with the City. Nothing contained in this Contract shall be construed in any manner so as to require or permit any act which is prohibited by law.

Sec. 10.8.2.1. Equal Benefits Ordinance.

(a) Legislative Findings. The City awards many contracts to private firms to provide services to the public and to City government. Many City contractors and subcontractors perform services that affect the proprietary interests of City government in that their performance impacts the success of City operations. The City holds a proprietary interest in the work performed by many employees employed by City contractors and subcontractors. In a very real sense, the success or failure of City operations may turn on the success or failure of these enterprises, for the City has a genuine stake in how the public perceives the services rendered for them by these businesses.

Discrimination in the provision of employee benefits between employees with domestic partners and employees with spouses results in unequal pay for equal work. Los Angeles law prohibits entities doing business with the City from discriminating in employment practices based on marital status and/or sexual orientation. The City's departments and contracting agents are required to place in all City contracts a provision that the company choosing to do business with the City agrees to comply with the City's nondiscrimination laws.

00030.03 Cont'd.

It is the City's intent, through the contracting practices outlined in this Ordinance, to assure that those companies wanting to do business with the City will equalize the total compensation between similarly situated employees with spouses and with domestic partners. The provisions of this Ordinance are designed to ensure that the City's contractors will maintain a competitive advantage in recruiting and retaining capable employees, thereby improving the quality of the goods and services the City and its people receive, and ensuring protection of the City's property.

(b) Definitions. For purposes of the Equal Benefits Ordinance only, the following shall apply.

(1) Awarding Authority means any Board or Commission of the City, or any employee or officer of the City, that is authorized to award or enter into any Contract, as defined in this ordinance, on behalf of the City, and shall include departments having control of their own funds and which adopt policies consonant with the provisions of the Equal Benefits Ordinance.

(2) Benefits means any plan, program or policy provided or offered by a Contractor to its employees as part of the employer's total compensation package. This includes but is not limited to the following types of benefits: bereavement leave, family medical leave, health benefits, membership or membership discounts, moving expenses, pension and retirement benefits, and travel benefits.

(3) Cash Equivalent means the amount of money paid to an employee with a Domestic Partner (or spouse, if applicable) in lieu of providing Benefits to the employee's Domestic Partner (or spouse, if applicable). The Cash Equivalent is equal to the direct expense to the employer of providing Benefits to an employee for his or her Domestic Partner (or spouse, if applicable) or the direct expense to the employer of providing Benefits for the dependents and family members of an employee with a Domestic Partner (or spouse, if applicable).

(4) City means the City of Los Angeles.

(5) Contract means an agreement the value of which exceeds $25,000. It includes agreements for work or services to or for the City; for public works or improvements to be performed; agreements for the purchase of goods, equipment, materials, or supplies; or grants to be provided, at the expense of the City or to be paid out of monies under the control of the City. The term also includes a Lease or License, as defined in the Equal Benefits Ordinance.

00030.03 Cont'd.

(6) Contractor means any person or persons, firm, partnership, corporation, joint venture, or any combination of these, or any governmental entity acting in its proprietary capacity that enters into a Contract with any Awarding Authority of the City. The term does not include Subcontractors.

(7) Designated Administrative Agency (DAA) means the Department of Public Works, Bureau of Contract Administration.

(8) Domestic Partner means any two adults, of the same or different sex, who have registered as domestic partners with a governmental entity pursuant to state or local law authorizing this registration or with an internal registry maintained by the employer of at least one of the domestic partners.

(9) Equal Benefits Ordinance means Los Angeles Administrative Code Section 10.8.2.1, *et seq.*, as amended from time to time.

(10) Equal Benefits means the equality of benefits between employees with spouses and employees with Domestic Partners, between spouses of employees and Domestic Partners of employees, and between dependents and family members of spouses and dependents and family members of Domestic Partners.

(11) Lease or License means any agreement allowing others to use property owned or controlled by the City, any agreement allowing others the use of City property in order to provide services to or for the City, such as for concession agreements, and any agreement allowing the City to use property owned or controlled by others.

(12) Subcontractor means any person or persons, firm, partnership, corporation, joint venture, or any combination of these, and any governmental entity, that assists the Contractor in performing or fulfilling the terms of the Contract. Subcontractors are not subject to the requirements of the Equal Benefits Ordinance unless they otherwise have a Contract directly with the City.

(c) Equal Benefits Requirements.

(1) No Awarding Authority of the City shall execute or amend any Contract with any Contractor that discriminates in the provision of Benefits between employees with spouses and employees with Domestic Partners, between spouses of employees and Domestic Partners of employees, and between dependents and family members of spouses and dependents and family members of Domestic Partners.

00030.03 Cont'd.

(2) A Contractor must permit access to, and upon request, must provide certified copies of all of its records pertaining to its Benefits policies and its employment policies and practices to the DAA, for the purpose of investigation or to ascertain compliance with the Equal Benefits Ordinance.

(3) A Contractor must post a copy of the following statement in conspicuous places at its place of business available to employees and applicants for employment: "During the performance of a Contract with the City of Los Angeles, the Contractor will provide equal benefits to its employees with spouses and its employees with domestic partners." The posted statement must also include a City contact telephone number which will be provided each Contractor when the Contract is executed.

(4) A Contractor must not set up or use its contracting entity for the purpose of evading the requirements imposed by the Equal Benefits Ordinance.

(d) Other Options for Compliance. Provided that the Contractor does not discriminate in the provision of Benefits, a Contractor may also comply with the Equal Benefits Ordinance in the following ways:

(1) A Contractor may provide an employee with the Cash Equivalent only if the DAA determines that either:

a. The Contractor has made a reasonable, yet unsuccessful effort to provide Equal Benefits; or

b. Under the circumstances, it would be unreasonable to require the Contractor to provide Benefits to the Domestic Partner (or spouse, if applicable).

(2) Allow each employee to designate a legally domiciled member of the employee's household as being eligible for spousal equivalent Benefits.

(3) Provide Benefits neither to employees' spouses nor to employees' Domestic Partners.

(e) Applicability.

(1) Unless otherwise exempt, a Contractor is subject to and shall comply with all applicable provisions of the Equal Benefits Ordinance.

00030.03 Cont'd.

(2) The requirements of the Equal Benefits Ordinance shall apply to a Contractor's operations as follows:

a. A Contractor's operations located within the City limits, regardless of whether there are employees at those locations performing work on the Contract.

b. A Contractor's operations on real property located outside of the City limits if the property is owned by the City or the City has a right to occupy the property, and if the Contractor's presence at or on that property is connected to a Contract with the City.

c. The Contractor's employees located elsewhere in the United States but outside of the City limits if those employees are performing work on the City Contract.

(3) The requirements of the Equal Benefits Ordinance do not apply to collective bargaining agreements ("CBA") in effect prior to January 1, 2000. The Contractor must agree to propose to its union that the requirements of the Equal Benefits Ordinance be incorporated into its CBA upon amendment, extension, or other modification of a CBA occurring after January 1, 2000.

(f) Mandatory Contract Provisions Pertaining to Equal Benefits. Unless otherwise exempted, every Contract shall contain language that obligates the Contractor to comply with the applicable provisions of the Equal Benefits Ordinance. The language shall include provisions for the following:

(1) During the performance of the Contract, the Contractor certifies and represents that the Contractor will comply with the Equal Benefits Ordinance.

(2) The failure of the Contractor to comply with the Equal Benefits Ordinance will be deemed to be a material breach of the Contract by the Awarding Authority.

(3) If the Contractor fails to comply with the Equal Benefits Ordinance the Awarding Authority may cancel, terminate or suspend the Contract, in whole or in part, and all monies due or to become due under the Contract may be retained by the City. The City may also pursue any and all other remedies at law or in equity for any breach.

00030.03 Cont'd.

(4) Failure to comply with the Equal Benefits Ordinance may be used as evidence against the Contractor in actions taken pursuant to the provisions of Los Angeles Administrative Code Section 10.40, *et seq.*, Contractor Responsibility Ordinance.

(5) If the DAA determines that a Contractor has set up or used its Contracting entity for the purpose of evading the intent of the Equal Benefits Ordinance, the Awarding Authority may terminate the Contract on behalf of the City. Violation of this provision may be used as evidence against the Contractor in actions taken pursuant to the provisions of Los Angeles Administrative Code Section 10.40, *et seq.*, Contractor Responsibility Ordinance.

(g) Administration.

(1) The DAA is responsible for the enforcement of the Equal Benefits Ordinance for all City Contracts. Each Awarding Authority shall cooperate to the fullest extent with the DAA in its enforcement activities.

(2) In enforcing the requirements of the Equal Benefits Ordinance, the DAA may monitor, inspect, and investigate to ensure that the Contractor is acting in compliance with the Equal Benefits Ordinance. Contractor's failure to cooperate with the DAA may result in a determination by the DAA that the Contractor is not in compliance with the Equal Benefits Ordinance, which may subject the Contractor to enforcement measures set forth in Section 10.8.2.1(h).

(3) The DAA shall promulgate rules and regulations and forms for the implementation of the Equal Benefits Ordinance. No other rules, regulations or forms may be used by an Awarding Authority of the City to accomplish this contract compliance program.

(h) Enforcement.

(1) If the Contractor fails to comply with the Equal Benefits Ordinance:

a. The failure to comply may be deemed to be a material breach of the Contract by the Awarding Authority; or

b. The Awarding Authority may cancel, terminate or suspend, in whole or in part, the contract; or

c. Monies due or to become due under the Contract may be retained by the City until compliance is achieved;

00030.03 Cont'd.

d. The City may also pursue any and all other remedies at law or in equity for any breach.

e. The City may use failure to comply with the Equal Benefits Ordinance as evidence against the Contractor in actions taken pursuant to the provisions of Los Angeles Administrative Code Section 10.40, et seq., Contractor Responsibility Ordinance.

(i) Non-applicability, Exceptions and Waivers.

(1) Upon request of the Awarding Authority, the DAA may waive compliance with the Equal Benefits Ordinance under the following circumstances:

a. The Contract is for the use of City property, and there is only one prospective Contractor willing to enter into the Contract; or

b. The Contract is for needed goods, services, construction of a public work or improvement, or interest in or right to use real property that is available only from a single prospective Contractor, and that prospective Contractor is otherwise qualified and acceptable to the City; or

c. The Contract is necessary to respond to an emergency that endangers the public health or safety, and no entity which complies with the requirements of the Equal Benefits Ordinance capable of responding to the emergency is immediately available; or

d. The City Attorney certifies in writing that the Contract involves specialized litigation requirements such that it would be in the best interests of the City to waive the requirements of the Equal Benefits Ordinance; or

e. The Contract is (i) with a public entity; (ii) for goods, services, construction of a public work or improvement, or interest in or right to use real property; and (iii) that is either not available from another source, or is necessary to serve a substantial public interest. A Contract for interest in or the right to use real property shall not be considered as not being available from another source unless there is no other site of comparable quality or accessibility available from another source; or

00030.03 Cont'd.

f. The requirements of the Equal Benefits Ordinance will violate or are inconsistent with the terms or conditions of a grant, subvention or agreement with a public agency or the instructions of an authorized representative of the agency with respect to the grant, subvention or agreement, provided that the Awarding Authority has made a good faith attempt to change the terms or conditions of the grant, subvention or agreement to authorize application of the Equal Benefits Ordinance; or

g. The Contract is for goods, a service or a project that is essential to the City or City residents and there are no qualified responsive bidders or prospective Contractors who could be certified as being in compliance with the requirements of the Equal Benefits Ordinance; or

h. The Contract involves bulk purchasing arrangements through City, federal, state or regional entities that actually reduce the City's purchasing costs and would be in the best interests of the City.

(2) The Equal Benefits Ordinance does not apply to contracts which involve:

a. The investment of trust monies, bond proceeds or agreements relating to the management of these funds, indentures, security enhancement agreements (including, but not limited to, liquidity agreements, letters of credit, bond insurance) for City tax-exempt and taxable financings, deposits of City's surplus funds in financial institutions, the investment of City monies in competitively bid investment agreements, the investment of City monies in securities permitted under the California State Government Code and/or the City's investment policy, investment agreements, repurchase agreements, City monies invested in U.S. government securities or pre-existing investment agreements;

b. Contracts involving City monies in which the Treasurer or the City Administrative Officer finds that either:

(i) No person, entity or financial institution doing business in the City, which is in compliance with the Equal Benefits Ordinance, is capable of performing the desired transaction(s); or
(ii) The City will incur a financial loss or forego a financial benefit which in the opinion of the Treasurer or City Administrative Officer would violate his or her fiduciary duties.

00030.03 Cont'd.

(3) The Equal Benefits Ordinance does not apply to contracts for gifts to the City.

(4) Nothing in this Subsection shall limit the right of the City to waive the provisions of the Equal Benefits Ordinance.

(5) The provisions of this Subsection shall apply to the Equal Benefits Ordinance only. The Equal Benefits Ordinance is not subject to the exemptions provided in Section 10.9 of this Code.

(j) Consistency with Federal or State Law. The provisions of the Equal Benefits Ordinance do not apply where the application of these provisions would violate or be inconsistent with the laws, rules or regulations federal or state law, or where the application would violate or be inconsistent with the terms or conditions of a grant or contract with the United States of America, the State of California, or the instruction of an authorized representative of any of these agencies with respect to any grant or contract.

(k) Severability. If any provision of the Equal Benefits Ordinance is declared legally invalid by any court of competent jurisdiction, the remaining provisions shall remain in full force and effect.

(l) Timing of Application.

(1) The requirements of the Equal Benefits Ordinance shall not apply to Contracts executed or amended prior to January 1, 2000, or to bid packages advertised and made available to the public, or any bids received by the City, prior to January 1, 2000, unless and until those Contracts are amended after January 1, 2000 and would otherwise be subject to the Equal Benefits Ordinance.

(2) The requirements of the Equal Benefits Ordinance shall apply to competitively bid Contracts that are amended after April 1, 2003, and to competitively bid Contracts that result from bid packages advertised and made available to the public after May 1, 2003.

(3) Unless otherwise exempt, the Equal Benefits Ordinance applies to any agreement executed or amended after January 1, 2000, that meets the definition of a Contract as defined within Subsection 10.8.2.1(b).

00030.03 Cont'd.

Sec. 10.8.3. Equal Employment Practices Provisions.

Every non-construction and construction Contract with, or on behalf of, the City of Los Angeles for which the consideration is $1,000 or more shall contain the following provisions, which shall be designated as the Equal Employment Practices provision of such contract:

A. During the performance of this Contract, the Contractor agrees and represents that it will provide Equal Employment Practices and the Contractor and each Subcontractor hereunder will ensure that in his or her Employment Practices persons are employed and employees are treated equally and without regard to, or because of, race, color, religion, national origin, ancestry, sex, sexual orientation, age, disability, marital status or medical condition.

1. This provision applies to work or service performed or materials manufactured or assembled in the United States.

2. Nothing in this section shall require or prohibit the establishment of new classifications of employees in any given craft, work or service category.

3. The Contractor agrees to post a copy of Paragraph A., hereof, in conspicuous places at its place of business available to employees and applicants for employment.

B. The Contractor will, in all solicitations or advertisements for employees placed by, or on behalf of, the Contractor, state that all qualified applicants will receive consideration for employment without regard to their race, color, religion, national origin, ancestry, sex, sexual orientation, age, disability, marital status or medical condition.

C. At the request of the Awarding Authority or the DAA, the Contractor shall certify in the specified format that he or she has not discriminated in the performance of City Contracts against any employee or applicant for employment on the basis or because of race, color, religion, national origin, ancestry, sex, sexual orientation, age, disability, marital status or medical condition.

D. The Contractor shall permit access to, and may be required to provide certified copies of, all of his or her records pertaining to employment and to employment practices by the awarding authority or the DAA for the purpose of investigation to ascertain compliance with the Equal Employment Practices provisions of City Contracts. Upon request, the Contractor shall provide evidence that he or she has or will comply therewith.

00030.03 Cont'd.

E. The failure of any Contractor to comply with the Equal Employment Practices provisions of this contract may be deemed to be a material breach of City Contracts. The failure shall only be established upon a finding to that effect by the Awarding Authority, on the basis of its own investigation or that of the DAA. No such finding shall be made or penalties assessed except upon a full and fair hearing after notice and an opportunity to be heard has been given to the Contractor.

F. Upon a finding duly made that the Contractor has failed to comply with the Equal Employment Practices provisions of a City Contract, the Contract may be forthwith cancelled, terminated or suspended, in whole or in part, by the Awarding Authority, and all monies due or to become due hereunder may be forwarded to, and retained by, the City of Los Angeles. In addition thereto, the failure to comply may be the basis for a determination by the Awarding Authority or the DAA that the said Contractor is a non-responsible bidder or proposer pursuant to the provisions of Section 10.40 of this Code. In the event of such a determination, the Contractor shall be disqualified from being awarded a Contract with the City of Los Angeles for a period of two years, or until the Contractor shall establish and carry out a program in conformance with the provisions hereof.

G. Notwithstanding any other provision of this contract, the City of Los Angeles shall have any and all other remedies at law or in equity for any breach hereof.

H. The Board of Public Works shall promulgate rules and regulations through the DAA, and provide necessary forms and required language to the Awarding Authorities to be included in City Request for Bids or Request for Proposal packages or in supplier registration requirements for the implementation of the Equal Employment Practices provisions of this Contract, and such rules and regulations and forms shall, so far as practicable, be similar to those adopted in applicable Federal Executive orders. No other rules, regulations or forms may be used by an Awarding Authority of the City to accomplish the contract compliance program.

I. Nothing contained in this Contract shall be construed in any manner so as to require or permit any act which is prohibited by law.

J. By affixing its signature on a Contract that is subject to this article, the Contractor shall agree to adhere to the Equal Employment Practices specified herein during the performance or conduct of City Contracts.

00030.03 Cont'd.

K. Equal Employment Practices shall, without limitation as to the subject or nature of employment activity, be concerned with employment practices, including, but not limited to:

1. hiring practices;

2. apprenticeships where approved programs are functioning and other on-the-job training for non-apprenticeable occupations;

3. training and promotional opportunities; and

4. reasonable accommodations for persons with disabilities.

L. All Contractors subject to the provisions of this section shall include a similar provision in all subcontracts awarded for work to be performed under the Contract with the City, and shall impose the same obligations including, but not limited to, filing and reporting obligations, on the Subcontractors as are applicable to the Contractor. Subcontracts shall follow the same thresholds specified in Section 10.8.1.1. Failure of the Contractor to comply with this requirement or to obtain the compliance of its Subcontractors with all such obligations shall subject the Contractor to the imposition of any and all sanctions allowed by law, including, but not limited to, termination of the Contractor's Contract with the City.

Sec. 10.8.4. Affirmative Action Program Provisions.

Every non-construction and construction Contract with, or on behalf of, the City of Los Angeles for which the consideration is $25,000 or more shall contain the following provisions which shall be designated as the Affirmative Action Program provisions of such Contract:

A. During the performance of a City Contract, the Contractor certifies and represents that the Contractor and each Subcontractor hereunder will adhere to an Affirmative Action Program to ensure that in its employment practices, persons are employed and employees are treated equally and without regard to or because of race, color, religion, national origin, ancestry, sex, sexual orientation, age, disability, marital status, domestic partner status or medical condition.

1. This section applies to work or services performed or materials manufactured or assembled in the United States.

2. Nothing in this section shall require or prohibit the establishment of new classifications of employees in any given craft, work or service category.

00030.03 Cont'd.

3. The Contractor shall post a copy of Paragraph A., hereof, in conspicuous places at its place of business available to employees and applicants for employment.

B. The Contractor shall, in all solicitations or advertisements for employees placed, by or on behalf of, the Contractor, state that all qualified applicants will receive consideration for employment without regard to their race, color, religion, national origin, ancestry, sex, sexual orientation, age, disability, marital status, domestic partner status or medical condition.

C. At the request of the Awarding Authority or the DAA, the Contractor shall certify on an electronic or hard copy form to be supplied, that the Contractor has not discriminated in the performance of City Contracts against any employee or applicant for employment on the basis or because of race, color, religion, national origin, ancestry, sex, sexual orientation, age, disability, marital status, domestic partner status or medical condition.

D. The Contractor shall permit access to, and may be required to provide certified copies of, all of its records pertaining to employment and to its employment practices by the Awarding Authority or the DAA for the purpose of investigation to ascertain compliance with the Affirmative Action Program provisions of City Contracts and, upon request, to provide evidence that it has or will comply therewith.

E. The failure of any Contractor to comply with the Affirmative Action Program provisions of City Contracts may be deemed to be a material breach of a City Contract. The failure shall only be established upon a finding to that effect by the Awarding Authority, on the basis of its own investigation or that of the DAA. No finding shall be made except upon a full and fair hearing after notice and an opportunity to be heard has been given to the Contractor.

F. Upon a finding duly made that the Contractor has breached the Affirmative Action Program provisions of a City Contract, the Contract may be forthwith cancelled, terminated or suspended, in whole or in part, by the Awarding Authority, and all monies due or to become due hereunder may be forwarded to and retained by the City of Los Angeles. In addition thereto, the breach may be the basis for a determination by the Awarding Authority or the Board of Public Works that the Contractor is a non-responsible bidder or proposer pursuant to the provisions of Section 10.40 of this Code. In the event of such determination, the Contractor shall be disqualified from being awarded a contract with the City of Los Angeles for a period of two years, or until he or she shall establish and carry out a program in conformance with the provisions hereof.

00030.03 Cont'd.

G. In the event of a finding by the Fair Employment and Housing Commission of the State of California, or the Board of Public Works of the City of Los Angeles, or any court of competent jurisdiction, that the Contractor has been guilty of a willful violation of the California Fair Employment and Housing Act, or the Affirmative Action Program provisions of a City Contract, there may be deducted from the amount payable to the Contractor by the City of Los Angeles under the contract, a penalty of ten dollars for each person for each calendar day on which the person was discriminated against in violation of the provisions of a City Contract.

H. Notwithstanding any other provisions of a City Contract, the City of Los Angeles shall have any and all other remedies at law or in equity for any breach hereof.

I. The Public Works Board of Commissioners shall promulgate rules and regulations through the DAA and provide to the Awarding Authorities electronic and hard copy forms for the implementation of the Affirmative Action Program provisions of City contracts, and rules and regulations and forms shall, so far as practicable, be similar to those adopted in applicable Federal Executive Orders. No other rules, regulations or forms may be used by an Awarding Authority of the City to accomplish this contract compliance program.

J. Nothing contained in City Contracts shall be construed in any manner so as to require or permit any act which is prohibited by law.

K. By affixing its signature to a Contract that is subject to this article, the Contractor shall agree to adhere to the provisions in this article for the duration of the Contract. The Awarding Authority may also require Contractors and suppliers to take part in a pre-registration, pre-bid, pre-proposal, or pre-award conference in order to develop, improve or implement a qualifying Affirmative Action Program.

1. The Contractor certifies and agrees to immediately implement good faith effort measures to recruit and employ minority, women and other potential employees in a non-discriminatory manner including, but not limited to, the following actions as appropriate and available to the Contractor's field of work. The Contractor shall:

(a) Recruit and make efforts to obtain employees through:

(i) Advertising employment opportunities in minority and other community news media or other publications.

00030.03 Cont'd.

(ii) Notifying minority, women and other community organizations of employment opportunities.

(iii) Maintaining contact with schools with diverse populations of students to notify them of employment opportunities.

(iv) Encouraging existing employees, including minorities and women, to refer their friends and relatives.

(v) Promoting after school and vacation employment opportunities for minority, women and other youth.

(vi) Validating all job specifications, selection requirements, tests, etc.

(vii) Maintaining a file of the names and addresses of each worker referred to the Contractor and what action was taken concerning the worker.

(viii) Notifying the appropriate Awarding Authority and the DAA in writing when a union, with whom the Contractor has a collective bargaining agreement, has failed to refer a minority, woman or other worker.

(b) Continually evaluate personnel practices to assure that hiring, upgrading, promotions, transfers, demotions and layoffs are made in a non-discriminatory manner so as to achieve and maintain a diverse work force.

(c) Utilize training programs and assist minority, women and other employees in locating, qualifying for and engaging in the training programs to enhance their skills and advancement.

(d) Secure cooperation or compliance from the labor referral agency to the Contractor's contractual Affirmative Action Program obligations.

(e) Establish a person at the management level of the Contractor to be the Equal Employment Practices officer. Such individual shall have the authority to disseminate and enforce the Contractor's Equal Employment and Affirmative Action Program policies.

(f) Maintain records as are necessary to determine compliance with Equal Employment Practices and Affirmative Action Program obligations and make the records available to City, State and Federal authorities upon request.

00030.03 Cont'd.

(g) Establish written company policies, rules and procedures which shall be encompassed in a company-wide Affirmative Action Program for all its operations and Contracts. The policies shall be provided to all employees, Subcontractors, vendors, unions and all others with whom the Contractor may become involved in fulfilling any of its Contracts.

(h) Document its good faith efforts to correct any deficiencies when problems are experienced by the Contractor in complying with its obligations pursuant to this article. The Contractor shall state:

(i) What steps were taken, how and on what date.

(ii) To whom those efforts were directed.

(iii) The responses received, from whom and when.

(iv) What other steps were taken or will be taken to comply and when.

(v) Why the Contractor has been or will be unable to comply.

2. Every contract of $25,000 or more which may provide construction, demolition, renovation, conservation or major maintenance of any kind shall also comply with the requirements of Section 10.13 of the Los Angeles Administrative Code.

L. The Affirmative Action Program required to be submitted hereunder and the pre-registration, pre-bid, pre-proposal or pre-award conference which may be required by the Awarding Authority shall, without limitation as to the subject or nature of employment activity, be concerned with such employment practices as:

1. Apprenticeship where approved programs are functioning, and other on-the-job training for non-apprenticeable occupations;

2. Classroom preparation for the job when not apprenticeable;

3. Pre-apprenticeship education and preparation;

4. Upgrading training and opportunities;

00030.03 Cont'd.

5. Encouraging the use of Contractors, Subcontractors and suppliers of all racial and ethnic groups; provided, however, that any contract subject to this ordinance shall require the Contractor, Subcontractor or supplier to provide not less than the prevailing wage, working conditions and practices generally observed in private industries in the Contractor's, Subcontractor's or supplier's geographical area for such work;

6. The entry of qualified women, minority and all other journeymen into the industry; and

7. The provision of needed supplies or job conditions to permit persons with disabilities to be employed, and minimize the impact of any disability.

M. Any adjustments which may be made in the Contractor's work force to achieve the requirements of the City's Affirmative Action Program in purchasing and construction shall be accomplished by either an increase in the size of the work force or replacement of those employees who leave the work force by reason of resignation, retirement or death and not by termination, layoff, demotion or change in grade.

N. This ordinance shall not confer upon the City of Los Angeles or any Agency, Board or Commission thereof any power not otherwise provided by law to determine the legality of any existing collective bargaining agreement and shall have application only to discriminatory employment practices by Contractors engaged in the performance of City Contracts.

O. All Contractors subject to the provisions of this article shall include a similar provision in all subcontracts awarded for work to be performed under the Contract with the City and shall impose the same obligations including, but not limited to, filing and reporting obligations, on the Subcontractors as are applicable to the Contractor. Failure of the Contractor to comply with this requirement or to obtain the compliance of its Subcontractors with all such obligations shall subject the Contractor to the imposition of any and all sanctions allowed by law, including, but not limited to, termination of the Contractor's Contract with the City.

## 04 MANDATORY PROVISIONS PERTAINING TO NON-DISCRIMINATION IN EMPLOYMENT AND AFFIRMATIVE ACTION IN HIRING EMPLOYEES

Sec. 10.13. Mandatory Provisions Pertaining to Non-discrimination in Employment and Affirmative Action in Hiring Employees in the Performance of Work on Certain City Construction Contracts.

A. Notwithstanding any other provision of this division to the contrary, every construction Contract involving an expenditure of $25,000 or more of City funds, except in cases of urgent necessity, as provided in Section 371 of the Charter of the City of Los Angeles and except as provided in Section 10.9 of this Code, shall contain these provisions as part of the Contract. By affixing its signature on a Contract, the Contractor shall agree to adhere to these provisions for the duration of the Contract.

B. Anticipated Utilization. At the request of the Awarding Authority or DAA, the Contractor must set forth anticipated minority, women, and all other staffing utilization by the Contractor and all Subcontractors on each project constructed by the City using those trades within the area of jurisdiction of the Los Angeles Building and Construction Trades Council within the City of Los Angeles in each work class and at all levels in terms of staff hours. The anticipated levels of minority, women and other staffing utilization shall be the levels at which each of those groups are represented in the relevant work force in the Greater Los Angeles Area as determined by the U.S. Bureau of the Census and made available by the DAA. Attainment of the anticipated levels of utilization may only be used as an indicia of whether the Contractor has complied with the requirements of this section and has applied its Affirmative Action Program in good faith and in a non-discriminatory manner. Failure to attain the anticipated levels of utilization shall not, by itself, disqualify the Contractor for award of a Contract or subject the Contractor to any sanctions or penalties.

   In no event may a Contractor utilize the requirements of this section in such a manner as to cause or result in discrimination against any person on account of race, color, religion, national origin, ancestry, sex, sexual orientation, age, disability, marital status, domestic partner status or medical condition.

C. The Contractor shall make a good faith effort with respect to apprenticeship and training programs to:

   1. Recruit and refer minority, women and other employees to such programs;

   2. Establish training programs within the company and/or its affiliates that will prepare minority, women and other employees for advancement opportunities; and

00030.04 Cont'd.

3. Abide by the requirements of the Labor Code of the State of California with respect to the provision of apprenticeship job opportunities.

D. No contract shall be executed until the appropriate Awarding Authority of the City of Los Angeles, and the Federal funding agency (if Federal funds are involved), has determined in writing that the Contractor has executed and filed with the Awarding Authority and the DAA any federal or state requirements.

E. It shall be no excuse that the union with which the Contractor has a collective bargaining agreement providing for referral, exclusive or otherwise, failed to refer minority, women or other employees.

F. Subject to this subsection, the Contractor shall execute further forms and documentation at times and as may be required by the appropriate Awarding Authority.

G. Where the Contractor has failed to comply with the requirements contained in this section, any and all sanctions allowed by law may be imposed upon the Contractor.

H. The DAA shall be responsible for administering the City's Contract Compliance Program in the manner described in Sections 22.359 through 22.359.2 of this Code.

I. All Contractors subject to the provisions of this section shall include a similar provision in all subcontracts awarded for work to be performed under the Contract with the City and shall impose the same obligations, including, but not limited to, filing and reporting obligations, on the Subcontractors as are applicable to the Contractor. Failure of the Contractor to comply with this requirement or to obtain the compliance of its Subcontractors with all such obligations shall subject the Contractor to the imposition of any and all sanctions allowed by law including, but not limited to, termination of the Contractor's Contract with the City.

05 EQUAL BENEFITS ORDINANCE COMPLIANCE AFFIDAVIT

A Administered by City of Los Angeles Department of Public Works, Bureau of Contract Administration, Office of Contract Compliance, located at 1149 S. Broadway, Suite 300, Los Angeles, CA 90015, Phone; (213) 847-2625, email address: bca.eeoe@lacity.org.

B Contractor must be certified as complying with Los Angeles Code Section 10.8.2.1, Equal Benefits Ordinance, prior to the execution of a City agreement. This form must be returned to City department awarding the agreement.

00030.05 Cont'd.

**EBO COMPLIANCE**

City of Los Angeles
Department of Public Works Bureau of
Contract Administration Office of Contract
Compliance
1149 S. Broadway, Suite 300, Los Angeles, CA 90015
Phone: (213) 847-2625 E-mail: bca.eeoe@lacity.org

## EQUAL BENEFITS ORDINANCE COMPLIANCE AFFIDAVIT

Prime contractors must certify compliance with Los Angeles Administrative Code (LAAC) Section 10.8.2.1 et seq. prior to the execution of a City agreement subject to the Equal Benefits Ordinance (EBO).

### SECTION 1. CONTACT INFORMATION

Company Name: Skanska USA Civil West California District Inc. RAMP Company ID 9816

Company Address: 1995 Agua Mansa Road

City: Riverside State: CA Zip: 92509

Contact Person: James Bailey Phone: (951) 684-5360 E-mail: James.Bailey@skanska.com

Approximate Number of Employees in the United States: 965

Approximate Number of Employees in the City of Los Angeles: 440

### SECTION 2. EBO REQUIREMENTS

The EBO requires City Contractors who provide benefits to employees with spouses to provide the same benefits to employees with domestic partners. Domestic Partner means any two adults, of the same or different sex, who have registered as domestic partners with a governmental entity pursuant to state or local law authorizing this registration, or with an internal registry maintained by the employer of at least one of the domestic partners.

Unless otherwise exempt, Contractor is subject to and shall comply with the EBO as follows:

A. Contractor's operations located within City limits, regardless of whether there are employees at those locations performing Work on City Contract; and
B. Contractor's operations located outside of City limits if the property is owned by City or City has a right to occupy the property, and if Contractor's presence at or on the property is connected to a Contract with City; and
C. Contractor's employees located elsewhere in the United States, but outside of City Limits, if those employees are performing Work on City Contract.

Contractor must post a copy of the following statement in conspicuous places at its place of business available to employees and applicants for employment:

"During the performance of a Contract with City of Los Angeles, Contractor shall provide equal benefits to its employees with spouses and its employees with domestic partners."

Form OCC/EBO-Affidavit (Rev 6/21/12)

00030.05 Cont'd.

**SECTION 3. COMPLIANCE OPTIONS**

I have read and understand the provisions of Equal Benefits Ordinance and have determined that this company shall comply as indicated below:

☐..... I have no employees.

☐..... I provide no benefits.

☐..... I provide benefits to employees only. Employees are prohibited from enrolling their spouse or domestic partner.

☑..... I provide equal benefits as required by City of Los Angeles EBO.

☐..... I provide employees with a "Cash Equivalent." Note: The "Cash Equivalent" is the amount of money equivalent to what your company pays for spousal benefits that are unavailable for domestic partners, or vice versa.

☐..... All or some employees are covered by a collective bargaining agreement (CBA) or union trust fund. Consequently, I shall provide Equal Benefits to all non-union represented employees, subject to the EBO, and shall propose to the affected unions that they incorporate the requirements of the EBO into their CBA upon amendment, extension, or other modification of the CBA.

☐..... Health benefits currently provided do not comply with the EBO. However, I shall make the necessary changes to provide Equal Benefits upon my next Open Enrollment period which begins on (Date) _____.

☐..... Our current company policies, i.e., family leave, bereavement leave, etc., do not comply with the provisions of the EBO. However, I shall make the necessary modifications within three (3) months from the date of this affidavit.

**SECTION 4. DECLARATION UNDER PENALTY OF PERJURY**

I understand that I am required to permit City of Los Angeles access to and upon request, must provide certified copies of all company records pertaining to benefits, policies and practices for the purpose of investigation or to ascertain compliance with Equal Benefits Ordinance. Furthermore, I understand that failure to comply with LAAC Section 10.8.2.1 et seq., Equal Benefits Ordinance may be deemed a material breach of any City contract by Awarding Authority. Awarding Authority may cancel, terminate or suspend in whole or in part, the contract; monies due or to become due under a contract may be retained by City until compliance is achieved. City may also pursue any and all other remedies at law or in equity for any breach. City may use the failure to comply with Equal Benefits Ordinance as evidence against Contractor in actions taken pursuant to the provisions of the LAAC Section 10.40, et seq., Contractor Responsibility Ordinance.

Skanska USA Civil West California District Inc. (Company Name) shall comply with Equal Benefits Ordinance requirements as indicated above prior to executing a contract with City of Los Angeles and shall comply for the entire duration of the contract(s).

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, and that I am authorized to bind this entity contractually.

Executed this 22 day of December, in the year 2025, at Riverside (City), California (State)

J Bailey
Signature

1995 Agua Mansa Road
Mailing Address

James Bailey
Name of Signatory (please print)

Riverside, CA 92509
City, State, Zip Code

Executive Vice President
Title

95-1751673
EIN/TIN

Form OCC/EBO-Affidavit (Rev 6/21/12)

## 06 SMALL BUSINESS ENTERPRISE PROGRAM (SBEP)

### A POLICY STATEMENT

City of Los Angeles Harbor Department is committed to creating an environment that provides all individuals and businesses open access to the business opportunities available at Port of Los Angeles in a manner that reflects the diversity of City of Los Angeles. Port of Los Angeles Small Business Enterprise Program (SBEP or the "Program") was created to provide additional opportunities for small businesses to participate in any and all contracts.

It is the policy of Harbor Department to solicit participation in the performance of all service contracts by all individuals and businesses, including but not limited to, small business enterprises (SBEs), very small business enterprises (VSBEs), women-owned businesses (WBEs), minority-owned businesses (MBEs), and disabled veterans business enterprises (DVBE). Program shall allow Department to target more effectively small and very small business participation (including MBEs, WBEs, and DVBEs). It is also the intent of Department to make it easier for small and very small businesses to participate in Department contracts by providing education and assistance on how to do business with City, including, but not limited to, ensuring that payments to small and very small businesses are processed in a timely manner.

City's Contracts Management and Opportunities Database, Regional Alliance Marketplace for Procurement (RAMP) is a free service provided by the Mayor's Office of Economic Development and the Minority Business Opportunity Committee. In order to ensure the highest participation of SBE/VSBE/MBE/WBE/DVBEs, all Bidders shall utilize RAMP, at https://www.rampla.org/s/, to outreach to potential subcontractors and suppliers. Bidders shall go on RAMP and notify subcontractors and suppliers that they shall be bidding and are looking for subcontractors and suppliers.

Bidders must be registered on RAMP at time of bid. Subcontractors and suppliers must be registered on RAMP within 4 Calendar Days after bids are closed.

00030.06 Cont'd.

Bidders, subcontractors, and suppliers identified in the bid submittal as SBE or VSBE must be certified at time of bid, as applicable. Bidders, subcontractors, and suppliers must submit a copy of SBE certificate or VSBE certificate from the agency utilized to obtain certification as SBE or VSBE to Engineer within 3 Business Days of close of bids in order to be acknowledged within the bid as SBE or VSBE. Refer to https://kentico.portoflosangeles.org/getmedia/aea536e1-5d48-440a-8857-c55907e3dc74/contracting-proprietary-sbe-cert-application for certification instructions.

Within 4 Calendar Days after close of bids, Bidders, subcontractors, and suppliers identified in the bid submittal as SBE or VSBE must be verified on RAMP as SBE (Proprietary) or VSBE (Harbor), as applicable.

B SMALL BUSINESS REQUIREMENT

The SBEP, which has a very small business enterprise component, is a results-oriented program, requiring contractors who receive contracts from the Department to perform outreach and utilize certified small and very small businesses.

Any bid submitted which fails to meet the small and very small business requirement as shown in NOTICE INVITING BIDS Section shall result in rejection of the bid. If no bids are submitted that meet the small and very small business participation identified above, all bids shall be rejected by Department.

For purposes of calculating small and very small business participation in order to meet the requirement, the following shall apply:

1 At the time of bid, SBE and VSBE participation levels shall be based on the percentage of total Contract amount (including Allowance Items) to be paid to SBE and VSBE subcontractors and suppliers.

2 If the prime contractor is an SBE, or VSBE, small or very small business participation is shown as 100%.

3 100% of payments to SBE or VSBE truckers and suppliers.

4 Final SBE and VSBE participation levels shall be based on the percentage of final Contract amount, including the utilized Allowance Item amounts.

00030.06 Cont'd.

Definitions:

Small Business Enterprise (SBE): Harbor Department, and other City of Los Angeles Proprietary Departments, defines an SBE as an independently owned and operated business that is not dominant in its field and meets criteria set forth by the Small Business Administration in Title 13, Code of Federal Regulations, Part 121, generally meeting SBA established size standards for most industries in the economy. Size standards can be accessed on the SBA Website at www.sba.gov/ca/la.

Very Small Business Enterprise (VSBE): Harbor Department, and other City of Los Angeles Proprietary Departments, defines a VSBE based on the State of California's micro-business definition which is (1) a small business that has average annual gross receipts of $5,000,000 or less within the previous 3 years, or (2) a small business manufacturer with 25 or fewer employees.

A Minority Business Enterprise (MBE) is defined as a business in which a minority owns and controls at least 51% of the business. A Woman Business Enterprise (WBE) is defined as a business in which a woman owns and controls at least 51% of the business. For the purpose of this Project, a minority includes:

(1) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

(3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, The Indian Subcontinent, or the Pacific Islands); and

(4) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

A Disabled Veteran Business Enterprise (DVBE) is defined as a business in which a disabled veteran owns at least 51 percent of the business, and the daily business operations are managed and controlled by one or more disabled veterans.

00030.06 Cont'd.

An OBE (Other Business Enterprise) is any enterprise that is not a SBE, VSBE, DVBE, MBE, or WBE.

Bidder shall be responsible for determining SBE and VSBE status of its subcontractors and suppliers for purposes of meeting the small and very small business requirements. Bidders, subcontractors, and suppliers identified in the bid submittal as SBE or VSBE must be certified at time of bid, as applicable Bidders, subcontractors, and suppliers must submit a copy of SBE certificate or VSBE certificate from the agency utilized to obtain certification as SBE or VSBE to Engineer within 3 Business Days of close of bids in order to be acknowledged within the bid as SBE or VSBE. All business participation shall be determined by the percentage paid to SBEs and VSBEs of the total amount of compensation under Agreement.

Contract Requirements:

Bidder shall complete, sign, notarize, and submit as part of the bid Contractor Ownership/RAMP Outreach Affidavit form included in Specifications as Subsection 00030.10 with a complete description of Work or supplies to be provided by each and the dollar amount of each such transaction entered in the online subcontractor list provided on CDBON and on the Supplier List in Subsection 00660.03 of CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION Section. Subcontractors and suppliers shall complete, sign, notarize, and submit Subcontractor/Supplier Ownership Affidavit and Contractor/Subcontractor/Supplier Information Form included in Subsection 00660.01 of CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION Section for each subcontractor and supplier by the time required in Subsection 00012.10 of NOTICE INVITING BIDS Section with a complete description of Work or supplies to be provided by each and the dollar amount of each such transaction. Contractor/Subcontractor/Supplier Information Form, when signed, shall signify Contractor's intent to comply with SBE requirement. Within 4 Calendar Days after bids are closed, Harbor Department shall verify SBE and VSBE status of Bidders, subcontractors, and suppliers.

Contractor shall not substitute an SBE or VSBE firm without obtaining prior approval of City and amending its Contract. A request for substitution must be based upon demonstrated good cause. If substitution is permitted, Contractor shall endeavor to make an in-kind substitution for the substituted SBE or VSBE.

00030.06 Cont'd.

During the performance of Contract, Contractor shall complete and submit to Engineer, a Monthly Subcontractor/Supplier Monitoring Report included in Specifications as Subsection 00030.10A. Engineer shall make the report available to Contractor in electronic/digital format. The completed report shall be submitted to Engineer on the form provided in Subsection 00030.10A of this Section. Among other information, the completed form shall reflect payments made to all (SBE/VSBE/MBE/WBE/DVBE/OBE) subcontractors and suppliers to date. The subcontractors or suppliers listed in Monthly Subcontractor/Supplier Monitoring Report shall be the same as those entered in the online subcontractor list provided on CDBON and submitted as part of the bid. All subcontractors/ suppliers shall be listed on the report, regardless of level of activity to date (even if payment to date is zero). The correctly completed report shall be submitted by Contractor at the beginning of each month.

In the event of Contractor's noncompliance during the performance of Contract, Contractor shall be considered in material breach of Contract. In addition to any other remedy available to City under the Contract or by operation of law, City may:

1 Withhold invoice payments to Contractor until noncompliance is corrected, and assess the costs of City's audit of books and records of Contractor and its subcontractors and suppliers.

2 Disqualify Contractor from participation in City contracts for a period of up to five (5) years in the event Contractor falsifies or misrepresents information contained in any form or other willful noncompliance as determined by City.

07 CONTRACT SOLICITATIONS CHARTER SECTION 470 (c) (12)

A Persons who submit a bid for this solicitation (Bidders) are subject to Charter Section 470 (c) (12) and related ordinances. As a result, Bidders may not make campaign contributions to and or engage in fundraising for certain elected City officials or candidates for elected City office from the time they submit the bid until either the contract is signed by City of Los Angeles, or the bid is withdrawn by Bidder, or City rejects all bids, whichever is earlier. The prohibitions continue for 12 months after Contract is signed by City for successful Bidder, and principals, subcontractors of at least $100,000, and principals of such subcontractors.

B Bidders must submit signed CEC Form 50 through CDBON at the time of bid. Bids submitted without signed CEC Form 50 shall be cause to be deemed nonresponsive in Engineer's discretion unless Bidder promptly corrects the omission after receiving a written request from Engineer. The original signature copy shall be submitted with the 3 Business Days documents in conformance with NOTICE INVITING BIDS Section, Subsection 09.

C Bidders must submit signed CEC Form 55 (which requires bidders to identify their principals) through CDBON at the time of bid. The original signature copy shall be submitted with the 3 Business Days documents in conformance with NOTICE INVITING BIDS Section, Subsection 09 or within 3 Business Days after receiving written request from Engineer. Bidders shall notify their principals and subcontractors in writing of the restrictions and include the notice in contracts with subcontractors. Bidders shall also identify their subcontractors performing $100,000 or more in Work on Contract, and the principals of these subcontractors. Bidders are only required to identify vendors or suppliers who provide additional services and $100,000 or more in materials or equipment. Bidders are not required to identify vendors or suppliers if no services are provided. Bids submitted without signed CEC Form 55 that, at a minimum, contains required information for Bidder and its principals may be deemed nonresponsive at Engineer's discretion unless Bidder promptly corrects the omission upon receipt of a written request from Engineer. If required information for any subcontractors and principals of subcontractors is not included on CEC Form 55 at the time of bid, updated CEC Form 55 containing all required information shall be submitted by apparent low Bidder, or other Bidders when requested by Engineer, within 3 Business Days after receiving written request from Engineer or the bid may be deemed nonresponsive if Bidder does not promptly correct the failure upon written request of Engineer.

D Bidders who fail to comply with City law may be subject to penalties, termination of Contract, and debarment. Additional information regarding these restrictions and requirements may be obtained from City Ethics Commission at (213) 978-1960 or https://ethics.lacity.org/.

00030.07 Cont'd.

E CEC Forms 50 and 55 may be obtained from City Ethics Commission at https://ethics.lacity.org/contracts/bidders/.

08 IRAN CONTRACTING ACT OF 2010

A California Legislature adopted the Iran Contracting Act of 2010 to respond to policies of Iran in a uniform fashion (PCC § 2201(q)). Iran Contracting Act prohibits Bidders engaged in investment activities in Iran from submitting bids for, or entering into or renewing contracts with public entities for goods and services of one million dollars ($1,000,000) or more (PCC § 2203(a)). In accordance with California Public Contract Code Sections 2200-2208, Bidders submitting bids for, entering into, or renewing contracts with Harbor Department for goods and services estimated at $1,000,000 or more are required to complete, sign, and submit Iran Contracting Act of 2010 Compliance Affidavit included as Subsection 00030.09 of this Section.

## 09 IRAN CONTRACTING ACT OF 2010 COMPLIANCE AFFIDAVIT (California Public Contract Code Sections 2200-2208)

California Legislature adopted Iran Contracting Act of 2010 to respond to policies of Iran in a uniform fashion (PCC § 2201(q)). Iran Contracting Act prohibits Bidders engaged in investment activities in Iran from submitting bids for, or entering into or renewing contracts with public entities for goods and services of one million dollars ($1,000,000) or more (PCC § 2203(a)). A Bidder who "engages in investment activities in Iran" is defined as either:

- A Bidder providing goods or services of twenty million dollars ($20,000,000) or more in the energy sector of Iran, including provision of oil or liquefied natural gas tankers, or products used to construct or maintain pipelines used to transport oil or liquefied natural gas, for the energy sector of Iran; or
- A Bidder that is a financial institution (as that term is defined in 50 U.S.C. § 1701) that extends twenty million dollars ($20,000,000) or more in credit to another person, for 45 days or more, if that person shall use the credit to provide goods or services in the energy sector in Iran and is identified on a list created by the California Department of General Services (DGS) pursuant to PCC § 2203(b) as a person engaging in the investment activities in Iran.

Bidder shall certify that at the time of submitting a bid for a new contract or for the renewal of an existing contract, he or she is not identified on the DGS list of ineligible businesses or persons and that the Bidder is not engaged in investment activities in Iran in violation of Iran Contracting Act of 2010.

> California law establishes penalties for providing false certifications, including civil penalties equal to the greater of $250,000 or twice the amount of the contract for which the false certification was made; contract termination; and three-year ineligibility to bid on contracts (PCC § 2205).

To comply with Iran Contracting Act of 2010, Bidder shall complete and sign ONE of the options shown below and submit with the bid.

### OPTION #1: CERTIFICATION

I, the official named below, certify that I am duly authorized to execute this certification on behalf of Bidder or financial institution identified below, and that Bidder or financial institution identified below is not on the current DGS list of persons engaged in investment activities in Iran and is not a financial institution extending twenty million dollars ($20,000,000) or more in credit to another person or vendor, for 45 days or more, if that other person or vendor shall use the credit to provide goods or services in the energy sector in Iran and is identified on the current DGS list of persons engaged in investment activities in Iran.

Name of Bidder/Financial Institution (Printed):
Skanska USA Civil West California District Inc.

Signed by: _____ (Authorized Signature)

James Bailey (Printed Name)

Executive Vice President (Title of Person Signing)

### OPTION #2: EXEMPTION

Pursuant to PCC § 2203(c) and (d), a public entity may permit a Bidder or financial institution engaged in investment activities in Iran, on a case-by-case basis, to be eligible for, or to submit a bid for, or enter into, or renew, a contract for services. If Bidder or financial institution identified below has obtained an exemption from the certification requirement under Iran Contracting Act of 2010, Bidder or financial institution shall complete and sign below and attach documentation demonstrating the exemption approval.

Name of Bidder/Financial Institution (Printed): _____

Signed by: _____ (Authorized Signature)

_____ (Printed Name)

_____ (Title of Person Signing)

## 10 CONTRACTOR OWNERSHIP / RAMP OUTREACH AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following is true and correct and include all material information necessary to identify and explain the operations of

Skanska USA Civil West California District Inc.
Name of Firm

as well as the ownership thereof. Further, the undersigned agrees to provide the Harbor Department, upon request, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Furthermore, the undersigned certifies that it has utilized RAMP to outreach to potential SBE/VSBE/MBE/WBE/DVBEs for potential subcontracting opportunities associated with this bid.

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| Small Business Enterprise (SBE) | Yes/No (Circle One)

| Very Small Business Enterprise (VSBE) | Yes/No (Circle One)

Is Your Firm an MBE Yes/No WBE Yes/No DVBE Yes/No OBE Yes/No (Circle as appropriate)

Signature _____ Title Executive Vice President

Printed Name James Bailey Date Signed December 22, 2025

NOTARY

(State of California)

County of Riverside )

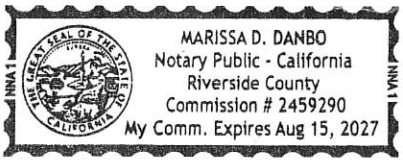
00030.10 Cont'd.

On December 22, 2025 before me, Marissa D. Danbo
Date Here insert Name and Title of the Officer

personally appeared James Bailey, Executive Vice President
Name(s) of Signer(s)

---

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.




I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Place Notary Seal Above

Signature Marissa D. Danbo
Signature of Notary Public

## 10 CONTRACTOR OWNERSHIP / RAMP OUTREACH AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following is true and correct and include all material information necessary to identify and explain the operations of

Malcolm Drilling Co., Inc.

Name of Firm

as well as the ownership thereof. Further, the undersigned agrees to provide the Harbor Department, upon request, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Furthermore, the undersigned certifies that it has utilized RAMP to outreach to potential SBE/VSBE/MBE/WBE/DVBEs for potential subcontracting opportunities associated with this bid.

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| Small Business Enterprise (SBE) | Yes/(No) (Circle One)

| Very Small Business Enterprise (VSBE) | Yes/(No) (Circle One)

Is Your Firm an MBE Yes/No WBE Yes/No DVBE Yes/No OBE Yes/No (Circle as appropriate)

Signature _____ Title District Manager / Vice President

Printed Name Brock Nieuwkoop Date Signed 12/23/25

NOTARY

(State of California)

County of Los Angeles )

00030.10 Cont'd.

On 12/23/25 (Date) before me, Amanda Nicole Dey, Notary Public (Here insert Name and Title of the Officer)

personally appeared Brock Nieuwkoop (Name(s) of Signer(s))

AMANDA NICOLE DEY
Notary Public - California
Los Angeles County
Commission # 2429123
My Comm. Expires Dec 5, 2026

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

MALCOLM DRILLING COMPANY INCORPORATED JULY 15, 1988 INC CALIFORNIA

Place Notary Seal Above

Signature _____ (Signature of Notary Public)

## 10 CONTRACTOR OWNERSHIP / RAMP OUTREACH AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following is true and correct and include all material information necessary to identify and explain the operations of

Sierra Landscape Development, Inc.

Name of Firm

as well as the ownership thereof. Further, the undersigned agrees to provide the Harbor Department, upon request, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Furthermore, the undersigned certifies that it has utilized RAMP to outreach to potential SBE/VSBE/MBE/WBE/DVBEs for potential subcontracting opportunities associated with this bid.

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| Small Business Enterprise (SBE) | Yes/No (Circle One)

| Very Small Business Enterprise (VSBE) | Yes/No (Circle One)

Is Your Firm an MBE Yes/No WBE Yes/No DVBE Yes/No OBE Yes/No (Circle as appropriate)

Signature _____ Title President

Printed Name Kevin James Watchler Date Signed 12/23/2025

NOTARY

(State of California)

County of Los Angeles )

See Attached Doc.

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )
County of Los Angeles – )

On December 23, 2025 – before me, Liliana Huayhua, Notary Public –,
*Date* *Here Insert Name and Title of the Officer*

personally appeared Kevin James Watchler
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

LILIANA HUAYHUA
COMM. #2436592
Notary Public · California
Los Angeles County
My Comm. Expires Feb. 21, 2027

Signature _____
*Signature of Notary Public*

*Place Notary Seal Above*

**OPTIONAL**

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: _____ | Signer's Name: _____ |
| ☐ Corporate Officer — Title(s): _____ | ☐ Corporate Officer — Title(s): _____ |
| ☐ Partner — ☐ Limited ☐ General | ☐ Partner — ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: _____ | ☐ Other: _____ |
| Signer Is Representing: _____ | Signer Is Representing: _____ |

©2015 National Notary Association • www.NationalNotary.org • 1-800-US NOTARY (1-800-876-6827) Item #5907

00030.10 Cont'd.

On _____ before me, _____
Date Here insert Name and Title of the Officer

personally appeared _____
Name(s) of Signer(s)

_____

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Place Notary Seal Above

Signature_____
Signature of Notary Public

# 10A MONTHLY SUBCONTRACTOR / SUPPLIER MONITORING REPORT

**SAMPLE MONTHLY SUBCONTRACTOR/SUPPLIER MONITORING REPORT**

Instructions: Please indicate the SBE/VSBE/MBE/WBE/OBE/DVBE participation levels achieved for the month of _____covered by the referenced contract number.

Contract No. | Spec. No. | Division | Contract Administrator

Contractor | | Group* | Contract Title/Project

Original Contract Amount | $10,000,000.00 | Contract Start Date | Contract End Date

Total Earned Value to Date | $ 6,000,000.00

Original Proposed Subcontractor Percentages SBE 22.00% VSBE 7.00% MBE 20.00% WBE 20.00% OBE 60.00% DVBE 0.00%

Contract-required minimum percentages (in parentheses) (21%) (6%)

*The VSBE and Total SBE min-required percentages above, are not additive. The Total SBE percentage includes VSBE participation.*

| | | | | | PROPOSED | | ACTUALS | | |
|---|---|---|---|---|---|---|---|---|---|
| | Name of Subcontractor | Type of Work Performed | SBE/VSBE | MBE/WBE/OBE/DVBE | Original Proposed Amount | Original Proposed Percentage | Earned Value to Date | Earned Value to Date Percentage | Total Earned Value Percentage |
| 1 | Construction Firm A | Asphalt Paving | VSBE, SBE | MBE, WBE | $300,000.00 | 3.00% | $150,000.00 | 50.00% | 2.50% |
| 2 | Construction Firm B | Demolition | VSBE, SBE | OBE | $200,000.00 | 2.00% | $25,000.00 | 12.50% | 0.42% |
| 3 | Supplier No. 1 | Concrete Piles | VSBE, SBE | OBE | $200,000.00 | 2.00% | $75,000.00 | 37.50% | 1.25% |
| | | | VSBE Subtotal: | | $700,000.00 | 7.00% | $250,000.00 | 35.71% | 4.17% |
| 1 | Construction Firm C | Low Voltage Electrical | SBE | WBE, DVBE | $500,000.00 | 5.00% | $100,000.00 | 20.00% | 1.67% |
| 2 | Supplier No. 2 | Precast Concrete Pipe | SBE | MBE | $1,000,000.00 | 10.00% | $250,000.00 | 25.00% | 4.17% |
| 3 | | | SBE | | | 0.00% | | #DIV/0! | 0.00% |
| | | | SBE Subtotal (Exclusive of VSBE): | | $1,500,000.00 | 15.00% | $350,000.00 | 23.33% | 5.83% |
| | | | Total SBE (Inclusive of VSBE): | | $2,200,000.00 | 22.00% | $600,000.00 | 27.27% | 10.00% |
| 1 | Construction Firm D | Concrete Pumping | No | OBE | $500,000.00 | 5.00% | $400,000.00 | 80.00% | 6.67% |
| 2 | Construction Firm F | Concrete Sawing | No | MBE | $500,000.00 | 5.00% | $500,000.00 | 100.00% | 8.33% |
| 3 | | | No | | | 0.00% | | #DIV/0! | 0.00% |
| 4 | | | No | | | 0.00% | | #DIV/0! | 0.00% |
| 5 | | | No | | | 0.00% | | #DIV/0! | 0.00% |
| | | | Non-SBE Total: | | $1,000,000.00 | 10.00% | $900,000.00 | 90.00% | 15.00% |

**Directions:**

Original Proposed Percentage = Original Proposed Amount / Original Contract Amount

Earned Value to Date Percentage = Earned Value to Date / Original Proposed Amount

Total Earned Value Percentage = Earned Value to Date / Total Earned Value to Date

*Group = SBE / VSBE / MBE / WBE / OBE / DVBE

Rev 3 / 1 / 11

## 00030.10A Cont'd. MONTHLY SUBCONTRACTOR/SUPPLIER MONITORING REPORT (Cont'd.)

**MONTHLY SUBCONTRACTOR/SUPPLIER MONITORING REPORT**

Instructions: Please indicate the SBE/VSBE/MBE/WBE/OBE/DVBE participation levels achieved for the month of _____covered by the referenced contract number.

Contract No. Spec. No. Division Contract Administrator

Contractor Group* Contract Title/Project

Original Contract Amount Contract Start Date Contract End Date

Total Earned Value to Date

Original Proposed Subcontractor Percentages SBE 0.00% VSBE 0.00% MBE 0.00% WBE 0.00% OBE 0.00% DVBE 0.00%

Contract-required minimum percentages (in parentheses) (0%) (0%)

*The VSBE and Total SBE min-required percentages above, are not additive. The Total SBE percentage includes VSBE participation.*

| | | | | | PROPOSED | | ACTUALS | | |
|---|---|---|---|---|---|---|---|---|---|
| | Name of Subcontractor | Type of Work Performed | SBE/VSBE | MBE/WBE/OBE /DVBE | Original Proposed Amount | Original Proposed Percentage | Earned Value to Date | Earned Value to Date Percentage | Total Earned Value Percentage |
| 1 | | | VSBE, SBE | | | | | | |
| 2 | | | VSBE, SBE | | | | | | |
| 3 | | | VSBE, SBE | | | | | | |
| | | | VSBE Subtotal: | | | | | | |
| 1 | | | SBE | | | | | | |
| 2 | | | SBE | | | | | | |
| 3 | | | SBE | | | | | | |
| | | | SBE Subtotal (Exclusive of VSBE): | | | | | | |
| | | | Total SBE (Inclusive of VSBE): | | | | | | |
| 1 | | | No | | | | | | |
| 2 | | | No | | | | | | |
| 3 | | | No | | | | | | |
| 4 | | | No | | | | | | |
| 5 | | | No | | | | | | |
| | | | Non-SBE Total: | | | | | | |

**Directions:**

Original Proposed Percentage = Original Proposed Amount / Original Contract Amount

Earned Value to Date Percentage = Earned Value to Date / Original Proposed Amount

Total Earned Value Percentage = Earned Value to Date / Total Earned Value to Date

*Group = SBE / VSBE / MBE / WBE / OBE / DVBE

Rev 3 / 1 / 11

## 11 FEDERAL REQUIREMENTS FOR FEDERAL-AID CONSTRUCTION

### A Build America, Buy America

Build America, Buy America requirements apply to steel and iron, manufactured products, and construction materials permanently incorporated into Project.

Steel and Iron Materials: Steel and iron materials must be melted and manufactured in the United States except:

1 Foreign pig iron and processed, pelletized, and reduced iron ore may be used in the domestic production of the steel and iron materials

2 If the total combined cost of the materials produced outside the United States does not exceed the greater of 0.1 percent of the total bid or $2,500, the material may be used if authorized.

Furnish steel and iron materials to be incorporated into Work with certificates of compliance and certified mill test reports. Mill test reports must indicate where the steel and iron were melted and manufactured. Melting and manufacturing processes for these materials, including an application of a coating, must occur in the United States.

Manufactured Products: Iron and steel used in precast concrete manufactured products must meet the requirements of Steel and Iron Materials Paragraph of this Article regardless of the amount used. Iron and steel used in other manufactured products must meet the requirements of Steel and Iron Materials Paragraph of this Article if the weight of steel and iron components constitute 90 percent or more of the total weight of the manufactured product.

Construction Materials: Build America, Buy America requirements apply to the following construction materials that are or consist primarily of:

1 Non-ferrous metals
2 Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables)
3 Glass (including optic glass)
4 Lumber
5 Drywall

Where one or more of these construction materials have been combined by a manufacturer with other materials through a manufacturing process, Build America, Buy America requirements do not apply unless otherwise specified.

00030.11 Cont'd.

Furnish construction materials to be incorporated into Work with certificates of compliance with each Project delivery. Manufacturer's certificate of compliance must identify where the construction material was manufactured and attest specifically to Build America, Buy America compliance.

Manufacturing processes for these materials must occur in the United States.

Build America, Buy America requirements do not apply to the following:

1 Tools and construction equipment used in performing Work
2 Temporary Work that is not incorporated into the finished Project

B Davis-Bacon and Related Act Provisions

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

00030.11 Cont'd.

1. Minimum wages (29 CFR 5.5)

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

00030.11 Cont'd.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
(ii) The classification is utilized in the area by the construction industry; and
(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

00030.11 Cont'd.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

12 PROPOSAL

Los Angeles, California

To Board of Harbor Commissioners:

The undersigned, having carefully examined Contract Documents for Specification No. 2804A at Port of Los Angeles, and having personally visited the site of Work and having become familiar with the conditions based upon the site visit and review of the reference materials, hereby proposes to furnish all materials and perform all Work required to complete Project in accordance with the Contract Documents, within the time set forth in Contract for the Grand Total stated in CDBON's bid item online form.

The undersigned represents all Work indicated in Contract Documents is included within the scope of Work of Contract, is included in the Grand Total for the item(s) stated in the online form, and shall not be construed to be extra Work for which extra compensation can be claimed.

The undersigned has carefully checked all figures inserted in the online form and understands that Board shall not be responsible for any errors or omissions on the part of the undersigned in making the bid.

The undersigned agrees upon acceptance of the bid for all Work indicated on Contract Documents, to enter into and execute an agreement, of which the documents listed in the table of contents of said Specification No. 2804A shall be made a part, at the Grand Total stated in the online form, and to furnish and execute such bonds and insurance as required.

The undersigned furthermore agrees that in case of default in execution of such agreement, or in furnishing the required bonds, the security accompanying this Proposal and the money payable thereon shall be forfeited and remain the property of Department. Such forfeiture shall not preclude recovery of any sum over and above the amount posted or guaranteed to which Department sustains damage by reason of such default or failure to contract.

The undersigned agrees that Board reserves the right, in its sole discretion, to accept or reject the bid, without price escalation, at any time within ninety (90) days after date and time of deadline to submit bids.

00030.12 Cont'd.

The undersigned acknowledges receipt of all addenda and accepts all conditions contained therein.

Contractor's License No. 140069 A HAZ Expiration Date 05/31/2026

By _____
Signature

James Bailey, Executive Vice President
Signature

Address 1995 Agua Mansa Rd., Riverside, CA 92509

Contractor declares that its authorized Taxpayer Identification Number (TIN) is 95-1751673. The above signed understands no payments shall be made under Contract without a valid TIN number.

Bidder Is* Skanska USA Civil West California District Inc.

If a partnership, state names of partners. If a corporation, state names of president and secretary.
James Bailey-Executive VP, Ryan Clayton-Senior VP

Tony Taddeo-Senior VP, Brett Bockmann-VP,Sec/Treas

The representations made herein are made under penalty of perjury.

*Corporation, Partnership, Limited Partnership, Individual

*If Bidder is a corporation, bid must be signed by a person authorized to do so by bylaw or resolution of that corporation.

*If Bidder is a partnership, bid must be signed by all partners unless bid is accompanied by proof that signing partner(s) is (are) authorized to bind partnership.

00030.12 Cont'd.

LOS ANGELES HARBOR DEPARTMENT
HEADQUARTERS LOCATION FORM

AT THE REQUEST OF A LOS ANGELES CITY COUNCIL MOTION, ALL BIDDERS SHALL SUBMIT THE FOLLOWING INFORMATION AT THE TIME OF BID OR PROPOSAL SUBMITTAL. THIS IS FOR INFORMATION ONLY AND SHALL IN NO WAY AFFECT CONTRACT SELECTION PROCESS.

DATE: December 22, 2025 SPECIFICATION NO. 2804A

PROJECT TITLE: AVALON PEDESTRIAN BRIDGE AND PROMENADE GATEWAY

COMPANY NAME: Skanska USA Civil West California District Inc.

CONTACT PERSON: James Bailey

COMPANY HEADQUARTERS ADDRESS: 1995 Agua Mansa Road

CITY: Riverside STATE: California ZIP CODE: 92509

COMPANY LOCATION ADDRESS 1995 Agua Mansa Road

CITY: Riverside STATE: California ZIP CODE: 92509

PHONE NUMBER: (951) 684-5360 NUMBER OF EMPLOYEES: 965

PERCENTAGE OF EMPLOYEES WHO RESIDE IN THE CITY OF LOS ANGELES 4.12%

James Bailey, Executive Vice President
NAME/TITLE

STATE OF CALIFORNIA
dca
DEPARTMENT OF CONSUMER AFFAIRS

CONTRACTORS
STATE LICENSE BOARD
ACTIVE LICENSE

License Number **140069** Entity CORP

Business Name SKANSKA USA CIVIL WEST
CALIFORNIA DISTRICT INC

Classification(s) A HAZ

Expiration Date 05/31/2026 www.cslb.ca.gov

SKANSKA

# CERTIFIED COPY OF CORPORATE RESOLUTION

I, Brett Bockmann, Vice President, Secretary/Treasurer of Skanska USA Civil West California District Inc., a California Corporation, do hereby certify that the following is a true and correct copy of a resolution that was adopted through action by unanimous written consent of the Board of Directors of Skanska USA Civil West California District Inc., and further certify that said resolution has not been repealed or amended and is still in full force and effect.

"RESOLVED, that James Bailey, Executive Vice President; Ryan Clayton, Senior Vice President/General Manager; Tony Taddeo, Senior Vice President; and Brett Bockmann, Vice President, Secretary/Treasurer, be and is hereby authorized on behalf of Skanska USA Civil West California District Inc. to execute bids, bid bonds, contracts, performance and payment bonds, and all other documents necessary for the execution and progress of contracts."

IN WITNESS WHEREOF, I have signed this instrument and caused the corporate seal of said corporation to be affixed this 22nd day of December, 2025.

Brett Bockmann, Vice President, Secretary/Treasurer
SKANSKA USA CIVIL WEST CALIFORNIA DISTRICT INC.

(SEAL)

STATE OF CALIFORNIA )

COUNTY OF RIVERSIDE )

Subscribed and sworn to before me this 14th day of May, 2025.

Marissa D. Danbo
Notary Public in and for the State of California

MARISSA D. DANBO
Notary Public - California
Riverside County
Commission # 2459290
My Comm. Expires Aug 15, 2027

CA

Public Works Support eCPR Search Knowledge MD

Contractor Registration Search Project Registration Search Services

Your information

Home > Customer Account Lookup > 1000003003 - SKANSKA USA CIVIL WEST CALIFORNIA DISTRI

Search

Search

1000003003 - SKANSKA USA CIVIL WEST CALIFORNIA DISTRI

# Customer Account Lookup

PWCR

1000003003

Contractor Status

DIR Approved

CSLB

140069

Business Phone

9513350067

Ext

Registration Start Date

2025-07-01

Legal Entity Name

SKANSKA USA CIVIL WEST CALIFORNIA DISTRI

Doing Business As (DBA)

SKANSKA USA CIVIL WEST CALIFORNIA DISTRI

Business Structure

-- None --

President

James Bailey

Email

cindy.hiebert@skanska.com

Registration End Date

2028-06-30

Crafts

Carpenter | Operating Engineer | Laborer and Related Classifications | Carpenter and Related Trades

# Address

Mailing Address

1995 AGUA MANSA ROADRiverside, CA, 92509

Mailing Address - City

RIVERSIDE

Mailing Address - State

CA

Mailing Address - Zip

92509

Mailing Address - Country

United States

Physical Address

Physical Address - City

Physical Address - State

Physical Address - Zip

Physical Address - Country

# Related Lists

Registration Dates (11)

Terms & Conditions | Privacy Policy | Disclaimer | Nondiscrimination Notice | Accessibility | dir.ca.gov

Copyright 2024 State of California

13 BID PROPOSAL LINE ITEMS

The bid proposal line items are located on Construction Division Business Opportunities Network (CDBON) online system. Enter bidder's unit prices in the online form. The extended prices for each bid item are automatically calculated by CDBON's online system based on unit prices entered. The Grand Total is automatically summed from the extended prices. A printed version of the bid proposal line items is included at the end of this Subsection of BIDDING DOCUMENTS Section of Specifications for information only.

CONTINGENCY ITEM(S)

Work described in the contingency item(s) in the online form may or may not be necessary depending on conditions discovered in the field after Contract Award. If Engineer determines that field conditions justify Work listed in the contingency items, the prices for the contingency items shall be used to adjust Contract amount for Work ordered by Engineer.

ALLOWANCE ITEM(S)

Work described in the allowance item(s) in the online form may or may not be necessary depending on conditions discovered in the field after Contract Award. If field conditions justify Work listed in the allowance items, Engineer shall issue a written authorization to proceed with Work item(s) described in the online form. Work under allowance items is exclusive of Work required elsewhere in Contract Documents unless specifically referenced. All Work performed under these allowance items shall be performed either on a negotiated cost basis prior to performing Work in accordance with the provisions of Subsection 01000.35 "Authority for Adjustments", or on a Time and Material basis in accordance with the provisions of Subsection 01000.34 "Cost-Plus Change Order Work (Change Orders)" of GENERAL CONDITIONS Section. Upon completion of Contract, any unused allowance remaining under each allowance bid item shall be credited back to Department.

Award: Award, if made, shall be made to a single Contractor. The lowest bidder shall be based on the sum of all the items for which a bid is requested, including all contingency items regardless of whether all of those items are actually awarded. The awarded Contractor's bid results provided in CDBON online system shall be inserted at the end of Subsection 00030.13 and shall become part of any Contract awarded.

| Section | ItemCode | ItemDesc | UnitOfMeasure | Quantity | UnitPrice |
|---|---|---|---|---|---|
| Main Bid | 1 | Lump Sum Construction (Drawing No.1-3302A): For furnishing transportation, labor, materials, equipment, mobilization, demobilization, and incidentals necessary to complete Work in accordance with Drawing No. 1-3302A, exclusive of Work covered by Item 2 through the last item of Bid Proposal Line Items | Lump Sum | 1 | |
| Main Bid | 2 | Lump Sum Construction (Drawing No.1-3472A): For furnishing transportation, labor, materials, equipment, mobilization, demobilization, and incidentals necessary to complete Work in accordance with Drawing No.1-3472A, exclusive of Work covered by Items 1 and 3 through the last item of Bid Proposal Line Items | Lump Sum | 1 | |
| Main Bid | 3 | Demolition of Avalon Boulevard: For furnishing transportation, labor, materials, equipment, mobilization, demobilization, demolition of Avalon Boulevard, and incidentals necessary to complete Work in accordance with Drawing No. 1-3472A, exclusive of Work covered by Item 2 | Lump Sum | 1 | |
| Main Bid | 4 | Asphalt Concrete Pavement: For furnishing transportation, labor, materials, and equipment to furnish and place asphalt concrete pavement including tack coat and mill and overlay, including additions to or deductions from the approximate quantity stipulated | Tons | 1,360 | |
| Main Bid | 5 | Lightweight Aggregate: For furnishing transportation, labor, materials, and equipment to furnish and place lightweight aggregate, including additions to or deductions from the approximate quantity stipulated | Cubic Yards | 6,000 | |
| Main Bid | 6 | Geogrid Fabric: For furnishing transportation, labor, materials, and equipment to furnish and install geogrid fabric (including crack filler and tack coat), including additions to or deductions from the approximate quantity stipulated | Square Yards | 1,500 | |
| Main Bid | 7 | Concrete Sidewalk, Curb Ramps, and Driveways: For furnishing transportation, labor, materials, and equipment to construct concrete sidewalk, curb ramps, and driveways, including additions to or deductions from the approximate quantity stipulated | Square Feet | 4,820 | |

SUBMITBIDS ONLINE

| | | | | | |
|---|---|---|---|---|---|
| Main Bid | 8 | Concrete Sidewalk, Curb Ramps, and Driveways for A Street: For furnishing transportation, labor, materials, and equipment to construct concrete sidewalk, curb ramps, and driveways on A Street, including additions to or deductions from the approximate quantity stipulated | Square Feet | 6,000 | |
| Main Bid | 9 | Integral Curb and Gutter: For furnishing transportation, labor, materials, and equipment to construct Type “C” concrete curb, including additions to or deductions from the approximate quantity stipulated | Linear Feet | 1,100 | |
| Main Bid | 10 | Crushed Miscellaneous Base: For furnishing transportation, labor, and equipment to load, haul, place, and compact crushed miscellaneous base, including additions to or deductions from the approximate quantity stipulated | Cubic Yards | 1,500 | |
| Main Bid | 11 | Crushed Miscellaneous Base for Walkway: For furnishing transportation, labor, and equipment to load, haul, place, and compact crushed miscellaneous base for walkway, including additions to or deductions from the approximate quantity stipulated | Cubic Yards | 4,000 | |
| Main Bid | 12 | Import Fill Soil: For furnishing transportation, labor, materials, and equipment to furnish, place, grade, and compact Contractor-furnished fill soil, including additions to or deductions from the approximate quantity stipulated | Cubic Yards | 61,000 | |
| Main Bid | 13 | Rehandling of Soil Material: For furnishing transportation, labor, materials, and equipment to excavate Contractor-furnished fill soil from an area within Project Site, place, grade, and compact fill soil to a different area within Project Site, including additions to or deductions from the approximate quantity stipulated | Cubic Yards | 6,000 | |

SUBMIT BIDS ONLINE

| | | | | | |
|---|---|---|---|---|---|
| Main Bid | 14 | Department-Furnished Import Fill Soil from LAXT: For furnishing transportation, labor, materials, and equipment to clear and grub, excavate, handle, load, transport, place, grade, and compact in place Department-furnished import fill soil from Department's LAXT source site within a 10 mile radius of Project Site as shown in Appendix "K" of Specifications, including additions to or deductions from the approximate quantity stipulated | Cubic Yards | 37,000 | |
| Main Bid | 15 | Department-Furnished Import Fill Soil: For furnishing transportation, labor, materials, and equipment to clear and grub, excavate, handle, load, transport, place, grade, and compact in place Department-furnished import fill soil from within Project Site as shown on Drawing No. 1-3472A Sheet G-01, including additions to or deductions from the approximate quantity stipulated | Cubic Yards | 12,600 | |
| Main Bid | 16 | Surcharge Material: For furnishing transportation, labor, materials, and equipment to test, characterize, furnish, place, grade, compact, handle, load, transport, and dispose of Contractor-furnished surcharge material, including additions to or deductions from the approximate quantity stipulated | Cubic Yards | 80,000 | |
| Main Bid | 17 | Surcharge Instrumentation and Investigations: For furnishing transportation, labor, materials, and equipment to perform geotechnical instrumentation and post construction investigations | Lump Sum | 1 | |
| Main Bid | 18 | Furnish 24-Inch Octagonal Concrete Indicator Piles: For furnishing transportation, labor, materials, and equipment to manufacture 24-inch octagonal prestressed concrete indicator piles and deliver to Project Site, including surplus piles, including additions to or deductions from the approximate quantity stipulated | Linear Feet | 320 | |

SUBMIT BIDS ONLINE

| | | | | | |
|---|---|---|---|---|---|
| Main Bid | 19 | Install 24-Inch Octagonal Concrete Indicator Piles: For furnishing transportation, labor, materials, and equipment to install 24-inch octagonal prestressed concrete indicator piles with Case Pile Wave Analysis Program (CAPWAP) and pile driving analyzer (PDA), including additions to or deductions from the approximate quantity stipulated | Each | 8 | |
| Main Bid | 20 | Furnish 24-Inch Octagonal Prestressed Concrete Piles: For furnishing transportation, labor, materials, and equipment to manufacture 24-inch octagonal prestressed concrete piles and deliver to Project Site, including surplus piles, including additions to or deductions from the approximate quantity stipulated | Linear Feet | 8,000 | |
| Main Bid | 21 | Install 24-Inch Octagonal Prestressed Concrete Piles: For furnishing transportation, labor, materials, and equipment to install 24-inch octagonal prestressed concrete piles, including surplus piles, including additions to or deductions from the approximate quantity stipulated | Each | 205 | |
| Main Bid | 22 | Guardrail: For furnishing transportation, labor, materials, and equipment to furnish and install guardrail and related appurtenances, including additions to or deductions from the approximate quantity stipulated | Linear Feet | 230 | |
| Main Bid | 23 | Playground Equipment: For furnishing transportation, labor, materials, and equipment to furnish and install the play areas including play elements and equipment | Lump Sum | 1 | |
| Main Bid | 24 | Playground Protective Surfacing: For furnishing transportation, labor, materials, and equipment to furnish and install the playground protective surfaces, including additions to or deductions from the approximate quantity stipulated | Square Foot | 20,000 | |
| Main Bid | 25 | Site Furnishings: For furnishing, labor, materials, and equipment to site furnishings including but not limited to bicycle racks, barbecue grills, concrete hot coal receptacles, picnic tables, benches, trash and recycle receptacles, drinking fountains, retractable bollards, dog bag stations, skate deterrents, and shade structures | Lump Sum | 1 | |

SUBMIT BIDS ONLINE

| | | | | | |
|---|---|---|---|---|---|
| Main Bid | 26 | Decomposed Granite Paving: For furnishing transportation, labor, materials, and equipment to furnish and install decomposed granite paving, including additions to or deductions from the approximate quantity stipulated | Square Feet | 13,000 | |
| Main Bid | 27 | Concrete Unit Pavers: For furnishing transportation, labor, materials, and equipment to furnish and install concrete unit pavers including but not limited to joint material, setting bed, concrete sub slab, and weep holes, including additions to or deductions from the approximate quantity stipulated | Square Feet | 21,000 | |
| Main Bid | 28 | Stainless Steel Handrails: For furnishing transportation, labor, materials, and equipment to furnish and install site railings including but not limited to stair railings and free-standing railing at steps and ramps, and excluding at overlook, including additions to or deductions from the approximate quantity stipulated | Linear Feet | 430 | |
| Main Bid | 29 | Architectural Cast-in-Place Concrete: For furnishing transportation, labor, materials, and equipment to furnish and install Craftsmen Specification architectural concrete paving, including reinforcing and excluding parking lot areas | Lump Sum | 1 | |
| Main Bid | 30 | Architectural Cast-in-Place Concrete for Parking Lot Areas: For furnishing transportation, labor, materials, and equipment to furnish and install Craftsmen Specification architectural concrete paving including reinforcing for parking lot areas | Lump Sum | 1 | |
| Main Bid | 31 | Field Offices: For furnishing transportation, labor, materials, equipment, and facilities to provide fully operational field offices with working utilities for Department personnel at Project Site | Lump Sum | 1 | |
| Main Bid | 32 | Striping and Pavement Markings: For furnishing transportation, labor, materials, and equipment to construct striping and paving markings for parking lots | Lump Sum | 1 | |
| Main Bid | 33 | Pedestrian Directional Signage: For furnishing transportation, labor, materials, and equipment to construct signage | Lump Sum | 1 | |

SUBMIT BIDS ONLINE

| | | | | | |
|---|---|---|---|---|---|
| Main Bid | 34 | Sundial: For furnishing transportation, labor, materials, and equipment to furnish and install sundial | Lump Sum | 1 | |
| Main Bid | 35 | Photographic Documentation: For furnishing transportation, labor, materials, and equipment to furnish, install, and operate system for photographic and panoramic photographic documentation | Lump Sum | 1 | |
| Main Bid | 36 | Sanitary Sewerage System: For furnishing transportation, labor, materials, and equipment to furnish and install sanitary sewerage system including maintenance holes for City of Los Angeles Bureau of Engineering B-Permit No. BR-600508 Index No. P-38614, excluding the sanitary sewerage system for the restroom building | Lump Sum | 1 | |
| Main Bid | 37 | Water Distribution System: For furnishing transportation, labor, materials, and equipment to furnish and install water distribution system | Lump Sum | 1 | |
| Main Bid | 38 | DWP Water Distribution System: For furnishing transportation, labor, materials, and equipment to abandon Department of Water and Power (DWP) water distribution system | Lump Sum | 1 | |
| Main Bid | 39 | Storm Drainage System: For furnishing transportation, labor, materials, and equipment to furnish and install storm drainage system excluding parking lot storm drain system | Lump Sum | 1 | |
| Main Bid | 40 | Parking Lot Storm Drainage System: For furnishing transportation, labor, materials, and equipment to furnish and install storm drainage system for parking lots | Lump Sum | 1 | |
| Main Bid | 41 | Electrical System: For furnishing transportation, labor, materials, and equipment to construct the electrical system excluding parking lot system and restroom | Lump Sum | 1 | |
| Main Bid | 42 | DWP Electrical System: For furnishing transportation, labor, materials, and equipment to construct the City of Los Angeles Department of Water and Power (LADWP) electrical system excluding procurement of cable and pulling of cable to be provided by LADWP | Lump Sum | 1 | |

SUBMIT BIDS ONLINE

| | | | | | |
|---|---|---|---|---|---|
| Main Bid | 43 | Site Lighting: For furnishing transportation, labor, materials, and equipment to site lighting including exterior luminaires with lamps, ballasts, drivers, luminaire-mounted photoelectric relays, poles, and accessories, excluding parking lot lighting | Lump Sum | 1 | |
| Main Bid | 44 | Street Lighting: For furnishing transportation, labor, materials, and equipment to street lighting including luminaires, anchor bolts, conduits, wires, and accessories as required | Lump Sum | 1 | |
| Main Bid | 45 | Bridge Lighting: For furnishing transportation, labor, materials, and equipment to bridge lighting including but not limited to exterior luminaires with lamps, ballasts, drivers, luminaire-mounted photoelectric relays, poles, and accessories | Lump Sum | 1 | |
| Main Bid | 46 | Rockscape: For furnishing transportation, labor, materials, and equipment to furnish and install rockscape | Lump Sum | 1 | |
| Main Bid | 47 | Planting and Irrigation System: For furnishing transportation, labor, materials, and equipment to construct irrigation system | Lump Sum | 1 | |
| Main Bid | 48 | Methane Zone Mitigation: For furnishing transportation, labor, materials, and equipment to furnish and install methane zone mitigation | Lump Sum | 1 | |
| Main Bid | 49 | Import Custom Topsoil: For furnishing transportation, labor, materials, and equipment to furnish, place, and grade custom topsoil including each type of planting soil except palm tree planting soil, including additions to or deductions from the approximate quantity stipulated | Cubic Yards | 18,500 | |
| Main Bid | 50 | Plant Establishment, Landscape Maintenance, and Site Care: For furnishing transportation, labor, materials, and equipment to perform plant establishment, maintenance of landscape, and site care | Lump Sum | 1 | |

SUBMIT BIDS ONLINE

| | | | | | |
|---|---|---|---|---|---|
| Main Bid | 51 | Palm Trees: For furnishing transportation, labor, materials, and equipment to furnish and install 15-foot BTH palm trees in place including palm tree planting soil, in the species shown on Drawings, including additions to or deductions from the approximate quantity stipulated | Each | 53 | |
| Main Bid | 52 | Worksite Traffic Control: For furnishing transportation, labor, materials, and equipment to perform worksite traffic control during construction | Lump Sum | 1 | |
| Main Bid | 53 | Traffic Signage: For furnishing transportation, labor, materials, and equipment to furnish and install traffic signage, parking signage, entry signage, striping, and related appurtenances shown on Drawings | Lump Sum | 1 | |
| Main Bid | 54 | Traffic Signal: For furnishing transportation, labor, materials, and equipment to furnish and install traffic signal and related appurtenances shown on Drawings, complete and operational | Lump Sum | 1 | |
| Main Bid | 55 | Restroom Building: For furnishing transportation, labor, materials, and equipment to furnish and install restroom building, complete and operational including but not limited to mechanical, electrical, plumbing, heating, ventilating, and air-conditioning (HVAC), and sanitary sewerage system | Lump Sum | 1 | |
| Main Bid | 56 | Railroad Flag Person(s): For furnishing transportation, labor, materials, and equipment to provide PHL railroad flag person(s), including additions to or deductions from the approximate quantity stipulated | 12 hour days | 180 | |
| Main Bid | 57 | Parking Lot Dewatering: For furnishing transportation, labor, materials, and equipment to dewater during excavating and trenching operations in parking lots | Lump Sum | 1 | |
| Main Bid | 58 | Bridge and Site Dewatering: For furnishing transportation, labor, materials, and equipment to dewater during excavating and trenching operations for bridge and Project Site excluding parking lots | Lump Sum | 1 | |

SUBMIT BIDS ONLINE

| | | | | | |
|---|---|---|---|---|---|
| Main Bid | 59 | Excavate, Stockpile, and Dispose of California Hazardous Waste Soil (Non-RCRA): For furnishing transportation, labor, materials, and equipment to excavate, stockpile, and dispose of California hazardous waste soil (non-RCRA), at a Class I licensed lined landfill, including additions to or deductions from the approximate quantity stipulated | Tons | 1,500 | |
| Main Bid | 60 | Excavate, Stockpile, and Dispose of or Recycle Contaminated/Non-Hazardous Waste Soil: For furnishing transportation, labor, materials, and equipment to excavate, stockpile, and dispose of or recycle contaminated/non-hazardous waste soil, including but not limited to hydrocarbon impacted soil and volatile organic compound contaminated (VOC) soil, at a licensed lined landfill or thermal desorption recycling facility, including additions to or deductions from the approximate quantity stipulated | Tons | 1,100 | |
| Main Bid | 61 | Mock-Ups for Arch Rib: For furnishing transportation, labor, materials, and equipment to construct mock-ups for arch rib in conformance with Appendix "H" of Specifications | Lump Sum | 1 | |
| Contingency Item | 62 | Subgrade Stabilization: For furnishing transportation, labor, materials, and equipment to excavate, remove, and dispose of unsuitable subgrade to furnish, place, and compact subgrade stabilization material, 1-inch nominal gradation, and place geotextile, including additions to or deductions from the approximate quantity stipulated | Cubic Yards | 200 | |
| Contingency Item | 63 | Qualified Precipitation Event (QPE) Sampling and Testing for pH and Turbidity: For furnishing transportation, labor, materials, and equipment to sample during rainy days Project qualified precipitation event and test for pH and turbidity, including additions to or deductions from the approximate quantity stipulated | Qualified Precipitation Event | 12 | |

SUBMIT BIDS ONLINE

| | | | | | |
|---|---|---|---|---|---|
| Contingency Item | 64 | Restrike 24-Inch Octagonal Concrete Production Piles without CAPWAP and PDA: For furnishing transportation, labor, materials, and equipment to restrike 24-inch octagonal concrete production piles without CAPWAP and PDA, including additions to or deductions from the approximate quantity stipulated | Each | 9 | |
| Contingency Item | 65 | Restrike 24-Inch Octagonal Concrete Production Piles with CAPWAP and PDA: For furnishing transportation, labor, materials, and equipment to restrike 24-inch octagonal and concrete production piles with CAPWAP and PDA, including additions to or deductions from the approximate quantity stipulated | Each | 9 | |
| Contingency Item | 66 | Restrike 24-Inch Octagonal Concrete Indicator Piles with CAPWAP and PDA: For furnishing transportation, labor, materials, and equipment to restrike 24-inch octagonal concrete indicator piles with CAPWAP and PDA, including additions to or deductions from the approximate quantity stipulated | Each | 9 | |
| Contingency Item | 67 | Spudding of Obstructions: For furnishing transportation, labor, materials, and equipment for spudding of obstructions during pile driving, including additions to or deductions from the approximate quantity stipulated | Each | 10 | |
| Contingency Item | 68 | Concrete Pile Buildups Greater than 6 Inches and Less than 4 Feet in Height: For furnishing transportation, labor, materials, and equipment to construct concrete pile buildups greater than 6 inches and less than 4 feet in height, including additions to or deductions from the approximate quantity stipulated | Each | 5 | |
| Contingency Item | 69 | Break Off and Dispose of 24-Inch Octagonal Concrete Production Piles: For furnishing transportation, labor, materials, and equipment to break off, remove, and dispose of 24-inch octagonal, including surplus piles, including additions to or deductions from the approximate quantity stipulated | Each | 5 | |

SUBMIT BIDS ONLINE

| | | | | | |
|---|---|---|---|---|---|
| Contingency Item | 70 | Pile Cut Off Over 6 Feet in Length: For furnishing transportation, labor, materials, and equipment to cut off, remove, and dispose of pile cut offs exceeding 6 feet in length, including additions to or deductions from the approximate quantity stipulated | Each | 5 | |
| Allowance Item | 71 | Modifications Related to Public Art: Bidder shall include in the bid the listed allowance to provide modifications including but not limited to utilities and demolition in coordination with public art installation as directed by Engineer | Lump Sum | 1 | 100,000 |
| Allowance Item | 72 | Work Associated with Regulatory Agency Change and Additional Requirements: Bidder shall include in the bid the listed allowance to perform work as required by agencies due to regulatory changes and additional requirements as directed by Engineer | Lump Sum | 1 | 300,000 |
| Allowance Item | 73 | Unforeseen Contaminated and Hazardous Soil and Groundwater: Bidder shall include in the bid the listed allowance to remove and dispose of contaminated and hazardous soil and groundwater as directed by Engineer | Lump Sum | 1 | 400,000 |
| Allowance Item | 74 | Unforeseen Utility and Substructure Modifications, Abandonment, Removals, and Additions: Bidder shall include in the bid the listed allowance to perform unforeseen utility and substructure modifications, abandonment, removals, and additions as directed by Engineer | Lump Sum | 1 | 500,000 |
| Allowance Item | 75 | Internet-Based Project Management: Bidder shall include in the bid the listed allowance to provide internet-based project management as directed by Engineer | Lump Sum | 1 | 50,000 |
| Allowance Item | 76 | Premium Time for Schedule Acceleration/Overtime: Bidder shall include in the bid the listed allowance to account for labor premium time pay differential for schedule acceleration or overtime as directed by Engineer | Lump Sum | 1 | 300,000 |

SUBMIT BIDS ONLINE

| | | | | | |
|---|---|---|---|---|---|
| Allowance Item | 77 | Cable Vibration Testing: Bidder shall include in the bid the listed allowance to perform dynamic testing of the stay cables and install dampers if large vibrations are observed in the cables and dynamic testing and installation of dampers shall be in conformance with Specifications as directed by Engineer | Lump Sum | 1 | 200,000 |
| Allowance Item | 78 | Partnering Facility: Bidder shall include in the bid the listed allowance to provide partnering facility as directed by Engineer | Lump Sum | 1 | 75,000 |
| Allowance Item | 79 | Design Modifications as Directed by Engineer: Bidder shall include in the bid the listed allowance to account for design modifications as directed by Engineer | Lump Sum | 1 | 200,000 |

END OF SECTION

SUBMIT BIDS ONLINE

THIS CONTRACT (hereinafter referred to as "Contract"), made and entered into by and between the City of Los Angeles, a Municipal Corporation (herein called "City"), acting by and through its Board of Harbor Commissioners (hereinafter called "Board"), and Skanska USA Civil West California District, Inc. (hereinafter referred to as "Contractor"). The effective date of this Contract (hereinafter referred to as "Effective Date") is the date of execution by the Executive Director upon authorization of Board, subject to the provisions of Charter Section 245 of City of Los Angeles. Unless terminated as herein provided, the term of this Contract shall not exceed three (3) years commencing on Effective Date.

WITNESSETH

In consideration of the covenants and conditions hereinafter contained, IT IS MUTUALLY AGREED BETWEEN CONTRACTOR AND CITY AS FOLLOWS:

## ARTICLE 1. CONTRACTOR'S OBLIGATIONS

### Section 1.1 CONTRACT DOCUMENTS

A This written agreement executed by Contractor and City together with the documents listed in Section 1.1B are Contract. Contractor has read and understands each and every provision of Contract Documents and its assent to and signature of this written agreement shall be deemed to constitute assent to and signature of all Contract Documents.

B Specification No. 2804A, together with documents listed in Table of Contents and defined in GENERAL CONDITIONS Section of said Specifications shall constitute Contract Documents.

C Contract Documents are complementary and require complete and finished Work. Anything shown or required of Contractor, in any one or more of said documents, shall be as binding as if contained in all said documents.

### Section 1.2 WORK TO BE DONE

Contractor, with full knowledge of the kind, quantity and quality of Work, materials, and services required, at Contractor's sole cost and expense, except as may be herein otherwise expressly specified, and in strict conformity with Specification No. 2804A, for AVALON PEDESTRIAN BRIDGE AND PROMENADE GATEWAY shall carry out Contract as awarded. Contractor shall complete Work in accordance with Section 1.3 Contract Time of this Section.

Section 1.3 CONTRACT TIME

A Contract Time for performance of Work under Contract shall be 900 Calendar Days commencing on the date stated in Notice to Proceed (NTP). Work shall be completed in conformance with the following milestones:

1 Contract Time for the completion of Milestone 1 shall be 240 Calendar Days commencing on the effective date of NTP.

2 Contract Time for the completion of Milestone 2 shall be 240 Calendar Days commencing on the completion of Milestone 1.

3 Contract Time for the completion of Milestone 3 shall be 540 Calendar Days commencing 90 Calendar Days after the effective date of NTP.

4 Contract Time for the completion of Milestone 4 shall be 90 Calendar Days commencing on the effective date of NTP.

5 Contract Time for the completion of Milestone 5 shall be 810 Calendar Days commencing on the effective date of NTP.

6 Contract Time for the completion of Milestone 6 shall be 150 Calendar Days commencing 660 Calendar Days after the effective date of NTP.

7 Contract Time for the completion of Milestone 7 shall be 90 Calendar Days commencing on the completion of Milestone 5.

Section 1.4 LIQUIDATED DAMAGES

A Contractor and City agree that, in the event that Work contemplated hereunder is not completed within the time required, it shall be impracticable and extremely difficult to determine or fix City's actual damage and therefore City shall be entitled to liquidated damages in the amount stipulated below for each and every Calendar Day the execution of said Work exceeds the time allowed for that purpose. Contractor agrees to all of the other terms of the liquidated damages provision set forth in GENERAL CONDITIONS Section of the Specifications.

1 Completion of Work specified in Section 1.3, Paragraph A1: $8,000.

2 Completion of Work specified in Section 1.3, Paragraph A2: $8,000.

3 Completion of Work specified in Section 1.3, Paragraph A3: $8,000.

4 Completion of Work specified in Section 1.3, Paragraph A4: $8,000.

5 Completion of Work specified in Section 1.3, Paragraph A5: $8,000.

6 Completion of Work specified in Section 1.3, Paragraph A6: $8,000.

7 Completion of Work specified in Section 1.3, Paragraph A7: $8,000.

## ARTICLE 2. COMPENSATION

### Section 2.1 PAYMENTS TO CONTRACTOR

In consideration for all labor, materials, and equipment furnished hereunder, and subject to Contractor's full compliance with the terms and conditions of Contract Documents, City shall pay Contractor the amount set forth in the "Bid Proposal Line Items," which is attached hereto and by this reference incorporated herein. Payments shall be made as set forth in GENERAL CONDITIONS Section.

## ARTICLE 3. OPERATIONS

### Section 3.1 QUALITY OF SERVICES

Work performed by Contractor shall be strictly in accordance with Drawings and Specifications, copies of which are on file in the office of Engineer. Said Work shall be performed in a manner which is consistent with Applicable Laws as defined in GENERAL CONDITIONS Section of Specifications in the construction industry.

### Section 3.2 INDEMNIFICATION

A Except as may arise from the sole or active negligence or willful misconduct of City, Contractor shall at all times relieve, indemnify, defend, protect, and save harmless City and any and all of its boards, officers, agents, and employees from any and all claims and demands, actions, proceedings, losses, liens, costs and judgments of any kind and nature whatsoever, including cost of litigation (including all actual litigation costs incurred by City, including but not limited to costs of experts and consultants), for death of or injury to persons or damage to property including property owned by or under the care and custody of City, and for civil fines and penalties, that may arise from or be caused directly or indirectly by:

1 Any dangerous, hazardous, unsafe or defective condition of, in or on Project Site and any Laydown Area(s), of any nature whatsoever, which may exist by reason of any act, omission, neglect, or any use or occupation of such premises by Contractor, its officers, agents, employees, subcontractors, or invitees;

2 Any undertaking of Work, or operation conducted upon or any use or occupation of Project Site and any Laydown Area(s) by Contractor, its officers, agents, employees, subcontractors, or invitees under or pursuant to the provisions of Contract or otherwise;

3 Any act, error, omission, willful misconduct, or negligence of Contractor, its officers, agents, employees, subcontractors, or invitees, arising from the use, operation, or occupancy of Project Site and any Laydown Area(s).

4 Any failure of Contractor, its officers, agents, employees, subcontractors, or invitees to comply with any of the terms or conditions of this Contract or any Applicable Laws; or

5 The conditions, operations, uses, occupations, acts, omissions or negligence referred to in Subdivisions (1), (2), (3), and (4) above, existing or conducted upon or arising from the undertaking of Work or use or occupation of Project Site and any Laydown Area(s) by Contractor on any other area within the Harbor District, as defined in Charter of City, including the approaches, channels, turning basins, and other waters.

B Contractor also agrees to indemnify City and pay for all damage or loss suffered by City and Department, including but not limited to damage to or loss of property, to the extent not insured by City, and loss of City revenue from any source, caused by or arising out of the conditions, operations, uses, occupations, acts, omissions or negligence referred to in Section 3.2 of this Section. The term “persons” as used in this Section shall include, but not be limited to, officers and employees of Contractor.

C Contractor shall also indemnify, defend, and hold City harmless from any and all claims, judgments, damages, penalties, fines, costs, liabilities, or losses which arise during or after the term of this Contract as a result of Contamination for which Contractor is otherwise responsible for under the terms of this Contract. This indemnification of City by Contractor includes, without limitation, costs incurred in connection with any investigation of site conditions or any clean up, remedial, removal, or restoration work required by any federal, state, or local governmental agency because of Contamination present in the soil or groundwater on or under Project Site and any Laydown Area(s).

D The indemnity obligations under Section 3.2 shall survive the expiration date of this Contract.

E Notwithstanding the provisions of Section 3.2, nothing contained herein shall be interpreted or enforced in violation of California Civil Code Section 2782.

Section 3.3 INSURANCE

A In addition to, and not as a substitute for, or limitation of, any of the indemnity obligations imposed by Section 3.2 of this Section, Contractor shall procure and maintain at its sole cost and expense and keep in force at all times during the term of this Contract the following insurance requirements of this Section.

B Commercial general liability or marine general liability insurance, including contractual liability and property damage insurance, written by an insurance company authorized to do business in the State of California, or approved by the California Department of Insurance as a surplus lines insurer eligible to do business in California, rated VII, A- or better in Best's Insurance Guide (or an alternate guide acceptable to City if a Best's Rating is not available) with Contractor's normal limits of liability but not less than Five Million Dollars ($5,000,000) for injury or death to one or more persons out of each accident or occurrence and Five Million Dollars ($5,000,000) for bodily injury and property damage for each occurrence / Five Million Dollars ($5,000,000) general aggregate. Additionally, each policy shall include an additional insured endorsement (CG 2010) naming City of Los Angeles Harbor Department, its officers, agents, and employees as Primary additional insureds. Contractor shall further procure and maintain, either by an endorsement thereto or by a separate policy, fire legal liability insurance with a minimum limit of Five Hundred Thousand Dollars ($500,000) covering legal liability of Contractor for damage or destruction to the works, buildings, and improvements owned by City provided that said minimum limits of liability shall be subject to adjustments by Executive Director to conform with the deductible amount of the fire insurance policy maintained by Board, with waiver of subrogation in favor of Contractor so long as permitted by Board's fire insurance policy, upon thirty (30) days' prior written notice thereof to Contractor at any time during the term of this Contract. Contractor shall delete railroad exclusion when Work is within 50 feet of railroad tracks.

C Contractor shall procure and maintain fire and extended coverage insurance covering One Hundred percent (100%) of the replacement value of the works, buildings, and improvements erected or owned by Contractor on Project Site and any Laydown Area(s), with such provision in the policies issued to cover the same, or in riders attached thereto, as shall provide for all losses to be payable to Board to be held in trust for reconstruction. In the event of loss or damage by fire to any of such works, buildings, or improvements, Contractor shall undertake replacement or reconditioning of such items within ninety (90) days following any such loss. As Contractor undertakes such replacement or reconditioning, such proceeds shall be released by Board to Contractor as payments are required for said purpose. Upon the completion of such replacement or reconditioning to the reasonable satisfaction of Executive Director, any balance thereof remaining shall be paid to said Contractor forthwith.

D Where Contractor utilizes any vehicles, Contractor shall procure and maintain at its sole cost and expense, and keep in force at all times during the term of this Contract, automobile insurance with limits of liability not less than One Million Dollars ($1,000,000) covering injuries or death resulting from each accident or claim arising out of any one claim or accident. This insurance shall cover all owned, non- owned, and/or hired automobiles. Additionally, each policy shall include an additional insured endorsement (CG 2010) naming City of Los Angeles Harbor Department, its officers, agents, and employees as Primary additional insureds.

E Where Contractor operates watercraft, Contractor shall procure and maintain protection and indemnity coverage with limits of One Million Dollars ($1,000,000) per occurrence for bodily injury, illness, death, loss of or damage to the property of another including masters and members of the vessel crew, and Jones Act risks or equivalent thereto internationally. City shall be named as an additional insured. Additionally, each policy shall include an additional insured endorsement (CG 2010) naming City of Los Angeles Harbor Department, its officers, agents, and employees as Primary additional insureds.

F Where Contractor's operations involve the storage or use of any type of hazardous materials or pollutants, Contractor shall procure and maintain environmental impairment liability insurance which shall include coverage for bodily injury, property damage, including third-party claims for on-site and off-site bodily injury and property damage, clean-up, and defense of suits, with a limit of at least Two Million Dollars ($2,000,000) per occurrence, which is to remain in effect at least five (5) years after Termination Date. Additionally, each policy shall include an additional insured endorsement (CG 2010) naming City of Los Angeles Harbor Department, its officers, agents, and employees as Primary additional insureds.

G Contractor shall secure the payment of compensation to any employees injured while performing work or labor necessary for and incidental to performance under this Contract in conformance with Section 3700 of the California Labor Code. Contractor shall file with City one of the following:

1 A certificate of consent to self-insure issued by the Director of Industrial Relations, State of California;

2 A certificate of Workers' Compensation insurance issued by an admitted carrier; or

3 An exact copy or duplicate thereof of the policy certified by the Director of Industrial Relations or the insurer.

4 Such documents shall be filed prior to Contractor's occupancy of Project Site and any Laydown Area(s). Where Contractor has employees who are covered by the United States Longshore and Harbor Workers' Compensation Act ("USLHWC Act"), Contractor shall furnish proof of such coverage to City. It is suggested that Contractor consult with its insurance professional of its choosing to determine whether its proposed operation methods shall render its employees subject to coverage under the USLHWC Act. All Workers' Compensation insurance submitted to City shall include an endorsement providing that any carrier paying benefits agrees to waive any right of subrogation it may have against City.

H Except as provided in Paragraph 1 below, Contractor shall, at Contractor's sole cost and expense, provide all risk builder's risk insurance covering loss, damage or destruction of property, including material in transit and stored on and off Project Site and any Laydown Area(s), satisfactory to City, in an amount at least equal to the value of the construction and materials on hand. Contractor's insurance broker or agent shall submit for approval said insurance to City's online insurance compliance system KwikComply™ https://kwikcomply.org/. Acceptable evidence of coverage shall name City as an additional named insured and as loss payee as its interest may appear.

1 Contractor need not provide all risk builder's risk insurance for fills; excavations; rock work; concrete or masonry walls and bulkheads retaining earth; foundations entirely below ground or in earth fill; pipe, sewer systems, conduit, and electric light and power systems entirely below ground or submerged; ballast and grading for railroad tracks on or in earth; pavements, sidewalks and pits on solid earth or in fill outside of buildings; incombustible poles, area lighting and metal fencing not attached to exterior or interior of buildings. Contractor is not relieved of the obligation to rebuild these improvements when damaged.

2 An installation risk or "floater" policy, written to cover only specific types of equipment during construction, may be provided to cover damage to work or high valued equipment or materials.

I Limits for coverage required under Section 3.3 of this Section shall provide first dollar coverage except that Executive Director may permit a self-insured retention or self-insurance in those cases where, in his or her sole judgment, such retention or self-insurance is justified by the net worth of Contractor. The self-insured retention or self-insurance shall provide that any other insurance maintained by City's Harbor Department shall be excess of Contractor's insurance and shall not contribute to it. In all cases, regardless of any deductible, retention, or self-insurance, Contractor shall have all the obligations of an "insurer" under the California Insurance Code and said insurance shall be deemed to include a defense of suits provision and a severability of interest clause.

J If Contractor maintains higher limits than the minimums shown above, City requires and shall be entitled to coverage for the higher limits maintained by Contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to City.

K Policies submitted pursuant to Section 3.3 of this Section shall, in addition, provide the following coverage either in the original policy or by endorsement substantially as follows:

1 "Notwithstanding any inconsistent statement in the policy to which this endorsement is attached, or any endorsement or certificate now or hereafter attached hereto, it is agreed that City of Los Angeles, acting by and through its Harbor Department, Board of Harbor Commissioners, and its officers, agents, and employees, are additional insureds hereunder, except to the extent prohibited by Applicable Laws, and that coverage is provided for contractual obligations, operations, uses, occupations, acts, and activities of all the insureds under this Specification, and under any amendments, modifications, extensions, or renewals of said Contract regardless of whether such contractual obligations, operations, uses, occupations, acts, and activities occur on Project Site and any Laydown Area(s) or elsewhere."

2 "The coverage provided by the policy to which this endorsement is attached is primary coverage and any other insurance carried by City is excess coverage."

3 "In the event of one of the named insureds incurring liability to any other of the named insureds, this policy shall provide protection for each named insured against whom claim is or may be made, including claims by other named insureds, in the same manner as if separate policies had been issued to each named insured. Nothing contained herein shall operate to increase the insurance company's limit of liability."

L All insurance procured by Contractor shall comply with the following:

1 For each insurance policy, Contractor shall give to Board of Harbor Commissioners a 10-days prior notice of cancellation or reduction in coverage for nonpayment of premium, and a 30-days prior notice of cancellation or reduction in coverage for any other reason, by written notice via registered mail and addressed to City of Los Angeles Harbor Department, Attn: Risk Manager and City Attorney's Office, 425 S. Palos Verdes Street, San Pedro, California 90731.

2 Electronic submission is the required method of submitting Contractor's insurance documents. KwikComply is City's online insurance compliance system which is designed to be used by insurance brokers and agents to submit client insurance certificates directly to City. Contractor's insurance broker or agent shall obtain access to KwikComply at http://kwikcomply.org and follow the instructions to register and submit the appropriate proof of insurance on Contractor's behalf.

3 Prior to the expiration of each policy, Contractor shall show through submitting to KwikComply that the policy has been renewed or extended or, if new insurance has been obtained, submit the appropriate proof of insurance to KwikComply. If Contractor neglects or fails to secure or maintain the required insurance, or if Contractor fails to submit proof of insurance as required above, City's Harbor Department may, at its option and at the sole cost and expense of Contractor, obtain such insurance for Contractor.

4 Executive Director, at his or her discretion, based upon recommendation of Risk Manager of City's Harbor Department, may request that Contractor increase or decrease amounts and types of insurance coverage required hereunder at any time during the term hereof by giving written notice to Contractor; provided that Contractor shall be entitled to an equitable adjustment under Contract to reimburse Contractor for any increase in the cost of such insurance to Contractor resulting from the requested changes.

5 Upon request by City, Contractor must furnish a copy of the binder of insurance and/or full certified copies of any or all polices of insurance required herein. Contractor's obligation to provide such copies shall survive the expiration of this Contract regardless of whether City's request is made prior to or after the expiration of this Contract.

6 The approval of insurance by Risk Manager shall be a condition precedent to the right of Contractor to demand or receive payment for Work under Contract requiring such insurance. No request for payment shall be processed until the required insurance has been approved by Risk Manager, and no Project Site and any Laydown Area(s) access shall be permitted until such approval has been given.

7 All insurance policies and surety bonds which Contractor is required to provide pursuant to Specifications, including, but not limited to, workers' compensation, liability, protection and indemnity, and builder's risk policies shall be placed with insurance carriers which are rated VII, A-, or better in Best's Insurance Guide. If a Best's Insurance Guide rating is not available, then the proposed carrier must meet comparable standards in another rating services satisfactory to City.

M Contractor shall report to the Engineer immediately and in writing to Executive Director within fifteen (15) days after it, its officers, or its managing agents have knowledge of any accident or occurrence involving death of or injury to any person or persons, or damage in excess of Ten Thousand Dollars ($10,000) to property, occurring upon Project Site and any Laydown Area(s), or elsewhere within the Harbor District, if Contractor's officers, agents, or employees are involved in such an accident or occurrence. Such report shall contain to the extent available: (1) the name and address of the persons involved; (2) a general statement as to the nature and extent of injury or damage; (3) the date and hour of occurrence; (4) the names and addresses of known witnesses; and (5) such other relevant information as may be known to Contractor, its officers, or its managing agents.

Section 3.4 COMPLIANCE WITH LAWS

During the performance of Contract, Contractor shall comply with all Applicable Laws as defined in GENERAL CONDITIONS Section of Specifications. Contractor shall also comply with the provisions of all permits.

## ARTICLE 4. MISCELLANEOUS

Section 4.1 BINDING EFFECT

Contract is to be binding on the heirs, successors and assigns of the parties hereto and is not to be assigned by either party without first obtaining the written consent of the other.

Section 4.2 NOTICES

Any notice, request, demand or other communication required or permitted hereunder shall be deemed to be properly given when deposited in the United States mail, postage prepaid, addressed as follows:

| To City: | To Contractor: |
|---|---|
| Executive Director | _____ |
| Port of Los Angeles | _____ |
| 425 South Palos Verdes Street | _____ |
| San Pedro, California 90731 | _____ |

Nothing contained herein shall preclude the giving of notice in any other manner allowed by law.

Section 4.3 RELATIONSHIP OF PARTIES

Nothing contained in Contract shall be construed as creating the relationship of employer and employee, master and servant, or principal and agent between the parties hereto. Contractor is an independent contractor and shall have no right or authority to assume or create any obligation, expressed or implied, on behalf of City.

Section 4.4 ENTIRE AGREEMENT

Contract, together with all other Contract Documents, constitutes the entire agreement between the parties hereto, and all other representations or statements heretofore made, verbal or written, are merged herein, and Contract may be amended only in writing and executed by duly authorized representatives of the parties hereto.

Section 4.5 LEGAL JUSTIFICATION AND RECOURSE

Contract shall be deemed entered into in Los Angeles, California, and shall be governed and construed in accordance with the laws of the State of California. In the event any provision hereof is held to violate any applicable law by a court of competent jurisdiction, such provision shall be deemed null and void to the extent thereof, without affecting the balance of Contract. If either party brings any action or proceeding to enforce, protect, or establish any right or remedy arising out of or based upon Contract, including but not limited to the recovery of damages for its breach, or based upon the claim that extra Work was performed, whether mandated by Contract or not, neither party in said action or proceeding shall be entitled to recover any attorney's fees. Each party hereby expressly waives the benefit of any California statute which would permit the award of any attorney's fees to a prevailing party in an action.

Section 4.6 TIME OF ESSENCE

Time is of the essence in Contract.

Section 4.7 LABOR CODE SECTION 1861

Contractor hereby certifies it is aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that Code, and that Contractor shall comply with such provisions before commencing the performance of Work of Contract.

Section 4.8 ASSIGNMENT OF CERTAIN CAUSES OF ACTION

In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, Contractor or subcontractor/supplier offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to Contractor, without further acknowledgment by the parties.

Section 4.9 TERMINATION DUE TO NON-APPROPRIATION OF FUNDS

Contract is subject to the provisions of Los Angeles City Charter which, among other things, precludes City from making any expenditure of funds or incurring any liability, including contractual commitments, in excess of the amount appropriated therefor.

Board, in awarding Contract, is expected to appropriate sufficient funds to meet the estimated expenditures through June 30 of the current fiscal year and to make further appropriations in each succeeding fiscal year during the life of Contract. However, they are under no legal obligation to do so.

City of Los Angeles, its boards, officers, and employees are not bound by the terms of this Contract or obligated to make any payment thereunder in any fiscal year in which Board does not appropriate funds therefor. Contractor is not entitled to any compensation in any fiscal year in which funds have not been appropriated in Contract by Board.

Although Contractor is not obligated to perform any Work under Contract in any fiscal year in which no appropriation for Contract has been made, Contractor agrees to resume performance of Work required by Contract on the same terms and conditions for a period of 60 days after the end of the fiscal year if an appropriation therefor is approved within that 60-day period. Contractor is responsible for maintaining all insurance and bonds during this 60 days period. The time for performance shall be extended during this period until the appropriation is made; however, such extension of time is not compensable.

If in any subsequent fiscal year funds are not appropriated for Work required by Contract, Contract shall be terminated. However, such termination shall not relieve the parties of liability for any obligation previously incurred.

Section 4.10 NO WAIVER

No waiver by either party at any time of any terms or conditions of this Contract shall be a waiver at any subsequent time of the same or any other term or condition. No breach of a covenant, term, or condition of this Contract shall be deemed to have waived by City unless the waiver is in writing and executed by City.

Section 4.11 JOINT AND SEVERAL OBLIGATIONS OF CONTRACTOR

If more than one individual or entity comprises Contractor, the obligations imposed on each individual or entity that comprises Contractor under this Contract shall be joint and several.

Section 5.1 SIGNATURES

IN WITNESS WHEREOF, the parties hereto have executed Contract on the date of the left of their signatures.

THE CITY OF LOS ANGELES, by its
Board of Harbor Commissioners

Dated: _____, 20__

By: _____
Executive Director

Attest: _____
Board Secretary

(SEAL)

Contractor

By: _____

_____
(Print/type Name and Title)

By: _____

Dated: _____, 20__

_____
(Print/type Name and Title)
Place of Business _____

_____
Contractor's License No. _____

_____
Expiration Date _____

APPROVED AS TO FORM AND LEGALITY

_____, 20__
HYDEE FELDSTEIN SOTO, City Attorney
STEVEN Y. OTERA, General Counsel

By _____
HELEN J. SOK, Deputy City Attorney

KNOW ALL PERSONS BY THESE PRESENTS:

That we, Skanska USA Civil West California District, Inc.

as principal _____, and Zurick American Insurance Company as surety(ies) are held and firmly bound unto THE CITY OF LOS ANGELES, CALIFORNIA, a municipal corporation, in the penal sum of _____

dollars ($ 101,930,015.00) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH: that whereas the principal entered into a certain contract, hereto attached, with City, for AVALON PEDESTRIAN BRIDGE AND PROMENADE GATEWAY

NOW THEREFORE, if said principal(s) shall fail to faithfully perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said Contract during the original term of said Contract and any extensions thereof that may be granted by City, with or without notice to the surety(ies), and during the life of any guaranty required under Contract, or shall fail to faithfully perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the surety(ies) being hereby waived, said surety(ies) shall fully and faithfully carry out and perform all of the terms, covenants and conditions of said Contract upon its part to be performed and if surety(ies) does so, then this obligation to be null and void, otherwise to remain in full force and effect, and in addition thereto, in case suit is brought upon this bond, the judgment rendered against the principal or surety(ies), or both, a reasonable attorney's fee, to be fixed by the court, taxed as costs and included in the judgment rendered therein, otherwise this obligation to be void.

It is further agreed that this bond guarantees compliance with all applicable provisions of Section 17.00 et seq. and Section 62.105 through 62.118 of the Municipal Code of CITY OF LOS ANGELES.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under their several hands and seals this ____day of _____, 20__.

(Principal) _____

_____

ATTEST (Surety) _____

_____ _____

(Surety) _____

_____

(Corporate Seal)

KNOW ALL PERSONS BY THESE PRESENTS:

That we, Skanska USA Civil West California District, Inc

as principal (s) and Zurick American Insurance Company as surety(ies) _____ are held and firmly bound unto THE CITY OF LOS ANGELES, a municipal corporation, acting by and through its Board of Harbor Commissioners, and any person or party named below in the penal sum equal to: One Hundred and One Million, Nine Hundred Thirty Thousand, Fifteen and 00/100----------dollars ($101,930,015.00) in lawful money of the United States, and the payment of which shall and truly be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH,

THAT WHEREAS, the principal (s) entered into a certain contract attached hereto with the City for AVALON PEDESTRIAN BRIDGE AND PROMENADE GATEWAY

NOW, THEREFORE, if said principal (s) as Contractor (s) or subcontractor (s) fail (s) to pay for any services provided by mechanics, material suppliers, contractors, subcontractors, lessors of equipment, artisans, architects, registered engineers, licensed land surveyors, machinists, builders, teamsters or dray, or fail (s) to pay all persons and laborers of every class performing labor upon or bestowing skill or other necessary service on, or furnishing materials or leasing equipment to be used or consumed in or furnishing materials or leasing equipment to be used or consumed in or furnishing appliances, teams or power contributing to a work or improvement or fail (s) to pay for the value of such labor done or materials furnished and for the value and use of such appliances, equipment, teams or power, whether done or furnished at the instance of the City or of any person acting by its authority or under it as contractor or otherwise, or fail (s) to pay for amounts due under the Unemployment Insurance Code of the State of California with respect to work, or labor performed by any such claimant during the original term of said Contract and any extension thereof that may be granted by City with or without notice to the surety(ies) or during the life of any guarantee required under Contract, or fail (s) to pay for any amounts required to be deducted, withheld and paid over to the Franchise Tax Board from the wages of Contractor and subcontractors/suppliers pursuant to that portion of the Revenue and Taxation Code, imposing liability for failure to deduct, withhold, and pay employee taxes, with respect to such work and labor, then in such event said surety(ies) will pay the same in an amount not exceeding the sum of One Hundred and One Million, Nine Hundred Thirty Thousand, Fifteen and 00/100----------dollars ($101,930,015.00) and, in addition thereto, in case suit is brought upon this bond and judgment rendered against the principal (s) or surety(ies), or both, a reasonable attorney's fee to be fixed by the court, taxed as costs and included in the judgment rendered therein; otherwise this obligation to be void.

It is understood and agreed by principal (s) and surety(ies) herein that by its terms, this payment bond shall insure to the benefit of any person named in Section 9100 of the California Civil Code so as to give a right of action such persons or their assigns in any suit brought upon this payment bond.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument under their several hands and seals this ____ day of _____, 20__.

ATTEST

_____

(Principal)_____

_____

(Surety) _____

_____

(Surety) _____

_____

(Corporate Seal)

INDIVIDUAL FORM

AFFIDAVIT OF COMPLETION OF WORK
UNDER SPECIFICATION NO. 2804A
CONTRACT NO. _____

(STATE OF CALIFORNIA)
(COUNTY OF LOS ANGELES)

_____, being first duly sworn, deposes
(Affiant)
and says:

Affiant is Contractor under Contract No. _____, and makes the following statements:

That, in accordance with the provisions under Subsection 01000.58 of GENERAL CONDITIONS Section of Specification No. 2804A which Specifications is a part of Contract No. _____, by and between City of Los Angeles and Affiant, to the best of my knowledge and belief, Work specified in said Specifications and said Contract has been completed in strict accordance with Drawings and Specifications therefor, that no lawful debts for labor or material are outstanding, and that no federal excise tax has been included in Contract price;

That all request for funds under Items of Contract, including Changes in Work, and under all billings of whatsoever nature are accurate, complete and final and that no additional compensation over and above the final payment now pending shall be requested or is due under Contract or under any adjustment issued thereunder;

That, in accordance with said Subsection 01000.58, upon receipt of said final payment now pending, Affiant acknowledges that City, Board thereof, Executive Director, Engineer and any and all authorized employees of City shall thereby be released from any and all claims or liability on account of Work performed under Contract or any additions thereof.

_____
(Affiant)

Subscribed and sworn to before me
this _____ day of _____, 20__.

Notary Public in and for said County of
Los Angeles, State of California
Form 298-E
11-12-73

CO-PARTNERSHIP FORM

AFFIDAVIT OF COMPLETION OF WORK
UNDER SPECIFICATION NO. 2804A
CONTRACT NO. _____

(STATE OF CALIFORNIA)
(COUNTY OF LOS ANGELES)

_____, a co-partner in the firm of
(Affiant)
_____, a co-partnership, being first
(Contractor)
duly sworn, deposes and says:

Affiant is one of the co-partners of _____ and makes
(Contractor)
the following statements and has the authority to do so for and on behalf of _____
_____
(Contractor)
a co-partnership, and Affiant personally;

That in accordance with the provisions under Subsection 01000.58 of GENERAL CONDITIONS Section of Specification No. 2804A, which Specifications is a part of Contract No. _____, by and between City of Los Angeles and _____
_____
(Contractor)
to the best of my knowledge and belief, Work specified in said Specifications and said Contract has been completed in strict accordance with Drawings and Specifications therefor, that no lawful debts for labor or materials are outstanding, and that no federal excise tax has been included in Contract price;

That all requests for funds under Items of Contract, including Changes in Work, and under all billings of whatsoever nature are accurate, complete and final and that no additional compensation over and above the final payment now pending shall be requested or is due under Contract or under any adjustment issued thereunder;

That, in accordance with said Subsection 01000.58, upon receipt of said final payment now pending, Affiant acknowledges for himself/herself and for the _____,
(Contractor)
that City, Board thereof, Executive Director, Engineer and any and all authorized employees of City shall thereby be released from any and all claims or liability on account of Work performed under Contract or any additions thereof.

_____
(Affiant)

Subscribed and sworn to before me
this _____ day of _____, 20__.

Notary Public in and for said County of
Los Angeles, State of California
Form 297-E
11-12-73

CORPORATE FORM

AFFIDAVIT OF COMPLETION OF WORK
UNDER SPECIFICATION NO. 2804A
CONTRACT NO. _____

(STATE OF CALIFORNIA)
(COUNTY OF LOS ANGELES)

_____, the _____ of _____,
(Affiant) (Title) (Contractor)
a corporation, being first duly sworn, deposes and says:

Affiant is the _____ of _____
(Title) (Contractor)
and makes the following statements for and on behalf of _____,
(Contractor)
a corporation.

That, in accordance with the provisions under Subsection 01000.58 of GENERAL CONDITIONS Section of Specification No. 2804A, which Specifications is a part of Contract No. ____, by and between City of Los Angeles and _____
_____
(Contractor)
to the best of my knowledge and belief, Work specified in said Specifications and said Contract has been completed in strict accordance with Drawings and Specifications therefore, that no lawful debts for labor or materials are outstanding, and that no federal excise tax has been included in Contract price;

That all requests for funds under Items of Contract, including Changes in Work, and under all billings of whatsoever nature are accurate, complete and final and that no additional compensation over and above the final payment now pending shall be requested or is due under Contract or under any adjustment issued thereunder;

That, in accordance with said Subsection 01000.58, upon receipt of said final payment now pending, Affiant acknowledges for himself/herself and for _____,
(Contractor)
that City, Board thereof, Executive Director, Engineer and any and all authorized employees of City shall thereby be released from any and all claims or liability on account of Work performed under Contract or any additions thereof.

_____
(Affiant)

Subscribed and sworn to before me
this _____ day of _____, 20__.

Notary Public in and for said County of
Los Angeles, State of California
Form 308-E
11-12-73

## 01 CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION FORM

| DEPARTMENT USE ONLY | | |
|---|---|---|
| Contract No.: | Award Date: | Contract Term: |
| Contract Title: | | Award Total: |

### PRIME CONTRACTOR

Business Name: Skanska USA Civil West California District Inc. Award Total: $ $101,930,015.00
Owner's Ethnicity: NA Gender: NA Group: SBE VSBE MBE WBE DVBE (OBE)
(Circle all that apply)
Primary NAICS Code: 237310
Address: 1995 Agua Mansa Rd
City/State/Zip: Riverside/CA/92509
Telephone: ( 951 ) 684-5360 FAX: ( )
Contact Person/Title: James Bailey
Email Address: james.bailey@skanska.com
State Contractor's I.D. 140069 DIR Registration No. 1000003003
RAMP Company ID 97793

### SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: Ace Fence Company Award Total: $ $1,095,777.00
Owner's Ethnicity: Asian Gender: Female Group: (SBE) VSBE (MBE) (WBE) DVBE OBE
(Circle all that apply)
Primary NAICS Code: 23899
Address: 727 Glendora Ave
City/State/Zip: La Puente/CA/91744
Telephone: ( 626 ) 333-0727 FAX: ( 626 ) 333-7843
Contact Person/Title: Benedicto Layos / Estimator
Email Address: blayos@acefencecompany.com
State Contractor's I.D. 996577 DIR Registration No. 1000004092
RAMP Company ID 79173
Description of Work to be Performed or Items Being Supplied: Cable railing, CL fence, and related

# CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: ARC Ventures Award Total: $ $2,213,360.00
Owner's Ethnicity: Asian Gender: Male Group: (SBE) VSBE MBE WBE DVBE OBE
(Circle all that apply)
Primary NAICS Code: 237110, 237990, 238110
Address: 100 S Hope St 1203
City/State/Zip: Los Angeles/CA/90015
Telephone: ( 657 ) 206-5805 FAX: ( )
Contact Person/Title: Lucas Silva
Email Address: lucas@arcventuresinc.com
State Contractor's I.D. 1054918 DIR Registration No. 1000570933
RAMP Company ID 219736
Description of Work to be Performed or Items Being Supplied: Restroom Building

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: Cicero Engineering Award Total: $ $857,094.00
Owner's Ethnicity: White Gender: Male Group: (SBE) VSBE MBE WBE DVBE (OBE)
(Circle all that apply)
Primary NAICS Code: 23899
Address: 3920 Valley Blvd, Unit A
City/State/Zip: Walnut/CA/91789
Telephone: ( 909 ) 594-9944 FAX: ( 909 ) 594-9946
Contact Person/Title: Frank Cicero/President
Email Address: fcicero@ciceroengineering.com
State Contractor's I.D. 812439 DIR Registration No. 1000011722
RAMP Company ID 99116
Description of Work to be Performed or Items Being Supplied: Install playground equipment and site furnishings

J Barker
Authorized signature

12/24/2025
Date

Refer to Subsection 00030.06 for SBE, VSBE, DVBE, MBE, WBE, and OBE definitions.

# CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: Granstrom Masonry Inc. Award Total: $ $1,218,000.00
Owner's Ethnicity: White Gender: Male Group: (SBE) (VSBE) MBE WBE DVBE (OBE)
(Circle all that apply)

Primary NAICS Code: 238140
Address: PO Box 7041
City/State/Zip: Torrance, CA, 90504
Telephone: ( 310 ) 327-2527 FAX: ( 310 ) 515-6330
Contact Person/Title: Elliot Granstrom - President
Email Address: estimating@granstrommasonry.com
State Contractor's I.D. 629489 DIR Registration No. 1000004794
RAMP Company ID 24359
Description of Work to be Performed or Items Being Supplied: BI 27 - Concrete Unit Pavers (Partial)

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: Integrity Rebar Placers Award Total: $ $2,556,226.00
Owner's Ethnicity: Hispanic Gender: Male Group: SBE VSBE (MBE) WBE DVBE OBE
(Circle all that apply)

Primary NAICS Code: 238120, 237310
Address: 1345 Nandina Ave
City/State/Zip: Perris/CA/92571
Telephone: ( 951 ) 696-6843 FAX: ( )
Contact Person/Title: EmilyWebster/Controller
Email Address: emily@integrityrebarplacers.com
State Contractor's I.D. 533729 DIR Registration No. 1000005302
RAMP Company ID 33676
Description of Work to be Performed or Items Being Supplied: Rebar and related

J Barker
Authorized signature

12/24/2025
Date

Refer to Subsection 00030.06 for SBE, VSBE, DVBE, MBE, WBE, and OBE definitions.

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: Jilk Heavy Construction Inc Award Total: $ $2,882,115.00
Owner's Ethnicity: White Gender: Male Group: (SBE) VSBE MBE WBE DVBE (OBE)
(Circle all that apply)
Primary NAICS Code: 238990, 238190, 237990, 237310
Address: 500 S. Kraemer Blvd., Suite 380
City/State/Zip: Brea/CA/92831
Telephone: ( 310 ) 830-6323 FAX: ( 310 ) 835-2163
Contact Person/Title: Jeremiah Jilk/CFO
Email Address: jeremiah@jilkhc.com
State Contractor's I.D. 709151 DIR Registration No. 1000002928
RAMP Company ID 10282
Description of Work to be Performed or Items Being Supplied: Driven Pile and related

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: KPA Constructors Inc. Award Total: $ $11,258,000.00
Owner's Ethnicity: Black Gender: Male Group: (SBE) (VSBE) (MBE) WBE DVBE OBE
(Circle all that apply)
Primary NAICS Code: 238210, 237130, 541330
Address: 40 N Altadena Drive, Ste 206
City/State/Zip: Pasadena/CA/91107
Telephone: ( 626 ) 346-9550 FAX: ( )
Contact Person/Title: Kit Wing/Vice President
Email Address: kwong@kpaconstructors.com
State Contractor's I.D. 1027883 DIR Registration No. 1000365192
RAMP Company ID 104869
Description of Work to be Performed or Items Being Supplied: Electrical for Field office, Sundial, Building, and BI 41, 43,45

J Bailey
Authorized signature

12/24/2025
Date

Refer to Subsection 00030.06 for SBE, VSBE, DVBE, MBE, WBE, and OBE definitions.

# CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: MSL Electric Inc. Award Total: $ 594,400.00
Owner's Ethnicity: N/A Gender: N/A Group: SBE VSBE MBE WBE DVBE (OBE)
(Circle all that apply)
Primary NAICS Code: 238210
Address: 2918 E. La Jolla St.
City/State/Zip: Anaheim Ca. 92806
Telephone: ( 714 ) 693-4837 FAX: ( 714 ) 693-4838
Contact Person/Title: Bryan Ballachey, PM/Estimator
Email Address: bryan@mslelectric.com
State Contractor's I.D. 822450 DIR Registration No. 1000000550
RAMP Company ID 64943
Description of Work to be Performed or Items Being Supplied: Traffic Signal & Street Lighting

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: Malcolm Drilling Company, Inc Award Total: $ $983,244.00
Owner's Ethnicity: N/A Gender: N/A Group: SBE VSBE MBE WBE DVBE (OBE)
(Circle all that apply)
Primary NAICS Code: 237310
Address: 4926 N. Azusa Canyon Road
City/State/Zip: Irwindale/CA/91706
Telephone: ( 626 ) 338-0035 FAX: ( )
Contact Person/Title:
Email Address: Brad Jones/Project Manager
State Contractor's I.D. 259543 DIR Registration No. 1000003389
RAMP Company ID 66310
Description of Work to be Performed or Items Being Supplied: Dewatering and related - No treatment

J Bailey
Authorized signature

12/24/2025
Date

Refer to Subsection 00030.06 for SBE, VSBE, DVBE, MBE, WBE, and OBE definitions.

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: Paramount Metal & Supply Co. Award Total: $ $1,596,561.00
Owner's Ethnicity: Asian Gender: Male Group: (SBE) VSBE (MBE) WBE DVBE OBE
(Circle all that apply)
Primary NAICS Code: 33271, 33299, 33121, 33122, 33149, 33324
Address: 8140 East Rosecrans Ave
City/State/Zip: Paramount/CA/90723
Telephone: ( 562 ) 634-8180 FAX: ( )
Contact Person/Title: Leanor Silva/President
Email Address: esilva@paramountmetals.com
State Contractor's I.D. 261180 DIR Registration No. 1000032907
RAMP Company ID 107374
Description of Work to be Performed or Items Being Supplied: Pedestrian Railing, Guardrail, and SS Handrail and related

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: Pure Effect, Inc. Award Total: $ $561,672.00
Owner's Ethnicity: N/A Gender: N/A Group: SBE VSBE MBE WBE DVBE (OBE)
(Circle all that apply)
Primary NAICS Code: 237310
Address: 601 W Valencia Dr
City/State/Zip: Fullerton/CA/92832
Telephone: ( 714 ) 639-7873 FAX: ( 714 ) 639-8530
Contact Person/Title: Paul Lanhardt/Estimator
Email Address: planhardt@pureeffect.com
State Contractor's I.D. 261180 DIR Registration No. 1000004972
RAMP Company ID 47129
Description of Work to be Performed or Items Being Supplied: Dewatering treatment

J Bailey
Authorized signature

12/24/2025
Date

Refer to Subsection 00030.06 for SBE, VSBE, DVBE, MBE, WBE, and OBE definitions.

# CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: Schwager Davis, Inc. Award Total: $ $748,750.00
Owner's Ethnicity: N/A Gender: N/A Group: SBE VSBE MBE WBE DVBE (OBE)
(Circle all that apply)
Primary NAICS Code: 237310
Address: 198 Hillsdale Avenue
City/State/Zip: San Jose/CA/95136
Telephone: ( 408 ) 281-9300 FAX: ( )
Contact Person/Title: Mohammad Mirah/Estimator
Email Address: mmirah@schwagerdavis.com
State Contractor's I.D. 492582 DIR Registration No. 1000005118
RAMP Company ID 66344
Description of Work to be Performed or Items Being Supplied: Prestressing, cable stays and related work

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: Shaw & Sons Concrete Contractors Award Total: $ $8,569,099.00
Owner's Ethnicity: N/A Gender: N/A Group: SBE VSBE MBE WBE DVBE (OBE)
(Circle all that apply)
Primary NAICS Code: 237310
Address: 829 W. 17th, Suite 5
City/State/Zip: Costa Mesa/CA/92627
Telephone: ( 949 ) 642-0660 FAX: ( 949 ) 642-0967
Contact Person/Title: Ryan Rood/Estimator
Email Address: ryan@shawconstruction.com
State Contractor's I.D. 274144 DIR Registration No. 1000024841
RAMP Company ID 10785
Description of Work to be Performed or Items Being Supplied: Architectural CIP Concrete and related work

J. Bailey
Authorized signature

12/24/2025
Date

Refer to Subsection 00030.06 for SBE, VSBE, DVBE, MBE, WBE, and OBE definitions.

# CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: Sierra Landscape Development Award Total: $ $3,446,323.00
Owner's Ethnicity: N/A Gender: N/A Group: (SBE) VSBE MBE WBE DVBE (OBE)
(Circle all that apply)
Primary NAICS Code: 56173, 23731, 23799, 23899
Address: PO Box 661265
City/State/Zip: Arcadia/CA/91066
Telephone: ( 626 ) 447-5260 FAX: ( )
Contact Person/Title: Muhammad Ali/Estimator
Email Address: muhammad@sierralandscapedev.com
State Contractor's I.D. 514938 DIR Registration No. 1000004455
RAMP Company ID 26030
Description of Work to be Performed or Items Being Supplied: Planting , Irrigation and rock scape and related

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: SpectraTurf Award Total: $ $580,962.00
Owner's Ethnicity: White Gender: Male Group: SBE VSBE MBE WBE DVBE (OBE)
(Circle all that apply)
Primary NAICS Code: 238990, 713990
Address: 555 S Promednade Ave, Suite 103
City/State/Zip: Corona/CA/92879
Telephone: ( 800 ) 875-5788 FAX: ( 951 ) 734-3630
Contact Person/Title: Alex Stout/Estimator / Chris Anderson/Operations Manager
Email Address: estimating@spectraturf.com - cranderson@spectraturf.com
State Contractor's I.D. 854429 DIR Registration No. 1000002615
RAMP Company ID 36003
Description of Work to be Performed or Items Being Supplied: Playground protective surfacing and related work

J Bailey
Authorized signature

12/24/2025
Date

Refer to Subsection 00030.06 for SBE, VSBE, DVBE, MBE, WBE, and OBE definitions.

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: Summit Environmental Contractors Award Total: $ $269,400.00
Owner's Ethnicity: Hispanic Gender: Female Group: (SBE) VSBE MBE WBE DVBE (OBE)
(Circle all that apply)
Primary NAICS Code: 562000
Address: 33161 Camino Capistrano, Suite F
City/State/Zip: San Juan Capistrano/CA/92675
Telephone: ( 949 ) 429-8269 FAX: ( 949 ) 542-4331
Contact Person/Title: Grace Aronne/President
Email Address: grace@summitenvcon.com
State Contractor's I.D. 929061 DIR Registration No. 1000024682
RAMP Company ID 69188
Description of Work to be Performed or Items Being Supplied: Hazardous Materials handling

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: Techno Coatings Inc. Award Total: $ $429,976.00
Owner's Ethnicity: White Gender: Male Group: (SBE) VSBE MBE WBE DVBE (OBE)
(Circle all that apply)
Primary NAICS Code: 238990, 238320
Address: 785 E Debra Lane
City/State/Zip: Anaheim/CA/92805
Telephone: ( 714 ) 635-1130 FAX: ( 714 ) 635-6357
Contact Person/Title: Nick Cichirillo/Estimator
Email Address: nick@technocoatings.com
State Contractor's I.D. 296517 DIR Registration No. 1000005841
RAMP Company ID 19143
Description of Work to be Performed or Items Being Supplied: Painting and related

J Bailey
Authorized signature

12/24/2025
Date

Refer to Subsection 00030.06 for SBE, VSBE, DVBE, MBE, WBE, and OBE definitions.

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: _____ Award Total: $ _____
Owner's Ethnicity: _____ Gender: _____ Group: SBE VSBE MBE WBE DVBE OBE
(Circle all that apply)
Primary NAICS Code: _____
Address: _____
City/State/Zip: _____
Telephone: ( ) _____ FAX: ( ) _____
Contact Person/Title: _____
Email Address: _____
State Contractor's I.D. _____ DIR Registration No. _____
RAMP Company ID _____
Description of Work to be Performed _____
or Items Being Supplied: _____

## SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: _____ Award Total: $ _____
Owner's Ethnicity: _____ Gender: _____ Group: SBE VSBE MBE WBE DVBE OBE
(Circle all that apply)
Primary NAICS Code: _____
Address: _____
City/State/Zip: _____
Telephone: ( ) _____ FAX: ( ) _____
Contact Person/Title: _____
Email Address: _____
State Contractor's I.D. _____ DIR Registration No. _____
RAMP Company ID _____
Description of Work to be Performed _____
or Items Being Supplied: _____

J Bailey
_____ _____
Authorized signature Date

Refer to Subsection 00030.06 for SBE, VSBE, DVBE, MBE, WBE, and OBE definitions.

SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: _____ Award Total: $ _____
Owner's Ethnicity: _____ Gender: _____ Group: SBE VSBE MBE WBE DVBE OBE
(Circle all that apply)
Primary NAICS Code: _____
Address: _____
City/State/Zip: _____
Telephone: ( ) _____ FAX: ( ) _____
Contact Person/Title: _____
Email Address: _____
State Contractor's I.D. _____ DIR Registration No. _____
RAMP Company ID _____
Description of Work to be Performed or Items Being Supplied: _____

SUBCONTRACTOR/SUPPLIER INFORMATION FORM (CIRCLE ONE)

Business Name: _____ Award Total: $ _____
Owner's Ethnicity: _____ Gender: _____ Group: SBE VSBE MBE WBE DVBE OBE
(Circle all that apply)
Primary NAICS Code: _____
Address: _____
City/State/Zip: _____
Telephone: ( ) _____ FAX: ( ) _____
Contact Person/Title: _____
Email Address: _____
State Contractor's I.D. _____ DIR Registration No. _____
RAMP Company ID _____
Description of Work to be Performed or Items Being Supplied: _____

J Bailey
Authorized signature _____ Date

Refer to Subsection 00030.06 for SBE, VSBE, DVBE, MBE, WBE, and OBE definitions.

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Subcontractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm Ace Fence Company

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| | | |
|---|---|---|
| Small Business Enterprise (SBE) | (Yes) or No | (Circle One) |
| Very Small Business Enterprise (VSBE) | Yes or No | (Circle One) |

Is your firm a DVBE (MBE) (WBE) OBE (Circle at least one)

Signature America Tang Title CFO

Printed Name America Tang Date Signed 12/22/2025

NOTARY

State of California

County of _____

# ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Los Angeles )

On December 22, 2025 before me, Kimberly Wong, Notary Public
(insert name and title of the officer)

personally appeared America Tang,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

KIMBERLY WONG
COMM. # 2479245
NOTARY PUBLIC - CALIFORNIA
LOS ANGELES COUNTY
COMM. EXPIRES FEB. 8, 2028

Signature _____ **(Seal)**

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Subcontractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm ARC Ventures

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| | | |
|---|---|---|
| Small Business Enterprise (SBE) | ~~Yes~~ or No | (Circle One) |
| Very Small Business Enterprise (VSBE) | Yes or No | (Circle One) |

Is your firm a DVBE MBE WBE OBE (Circle at least one)

Signature _____ Title President

Printed Name Lucas Silva Date Signed 12/17/2025

NOTARY

State of California

County of see attachment

**CALIFORNIA ACKNOWLEDGMENT** CIVIL CODE § 1189

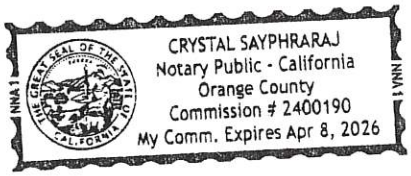
A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Orange }

On 12-17-25 before me, Crystal Sayphraraj, Notary Public,
*Date* *Here Insert Name and Title of the Officer*

personally appeared Lucas Silva
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.




I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____
*Signature of Notary Public*

*Place Notary Seal and/or Stamp Above*

**OPTIONAL**

*Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: _____ | Signer's Name: _____ |
| ☐ Corporate Officer – Title(s): _____ | ☐ Corporate Officer – Title(s): _____ |
| ☐ Partner – ☐ Limited ☐ General | ☐ Partner – ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: _____ | ☐ Other: _____ |
| Signer is Representing: _____ | Signer is Representing: _____ |

©2019 National Notary Association

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Subcontractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm Cicero Engineering Inc.

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| | | |
|---|---|---|
| Small Business Enterprise (SBE) | [Yes] or No | (Circle One) |
| Very Small Business Enterprise (VSBE) | Yes or [No] | (Circle One) |

Is your firm a DVBE MBE WBE [OBE] (Circle at least one)

Signature _____ Title President

Printed Name Frank Cicero Date Signed December 23, 2025

NOTARY

State of California

County of Attached

On _____ before me, _____
Date Here insert Name and Title of the Officer

personally appeared _____
Name(s) of Signer(s)

_____

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Place Notary Seal Above Signature_____

_____
Signature of Notary Public

**CALIFORNIA ACKNOWLEDGMENT** CIVIL CODE § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Los Angeles

On December 23, 2025 (*Date*) before me, Jennifer Martin, Notary Public (*Here Insert Name and Title of the Officer*),

personally appeared Frank Cicero (*Name(s) of Signer(s)*),

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

JENNIFER MARTIN
Notary Public - California
Orange County
Commission # 2398619
My Comm. Expires Apr 22, 2026

*Place Notary Seal and/or Stamp Above*

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____
*Signature of Notary Public*

**OPTIONAL**

*Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: _____ | Signer's Name: _____ |
| ☐ Corporate Officer – Title(s): _____ | ☐ Corporate Officer – Title(s): _____ |
| ☐ Partner – ☐ Limited ☐ General | ☐ Partner – ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: _____ | ☐ Other: _____ |
| Signer is Representing: _____ | Signer is Representing: _____ |

©2019 National Notary Association

Printed on: 10/17/2025 1:54:56 PM

To verify most current certification status go to: https://www.caleprocure.ca.gov

DGS
CALIFORNIA DEPARTMENT OF GENERAL SERVICES

# Office of Small Business & DVBE Services

**Certification ID:** 1802865

**Legal Business Name:**
CICERO ENGINEERING INC.

**Doing Business As (DBA) Name 1:**

**Doing Business As (DBA) Name 2:**

**Address:**
3920 VALLEY BLVD
UNIT A
WALNUT
CA 91789

**Email Address:**
jmartin@ciceroengineering.com

**Business Web Page:**

**Business Phone Number:**
909/594-9944

**Business Fax Number:**

**Business Types:**
Construction , Service

| Certification Type | Status | From | To |
|---|---|---|---|
| SB | Approved | 10/17/2025 | 10/31/2027 |

Stay informed! KEEP YOUR CERTIFICATION PROFILE UPDATED!
-LOG IN at CaleProcure.CA.GOV

Questions?
Email: Certification@dgs.ca.gov
Call OSDS Main Number: 916-375-4940
707 3rd Street, 1-400, West Sacramento, CA 95605

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Subcontractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm Granstrom Masonry Inc.

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| | | |
|---|---|---|
| Small Business Enterprise (SBE) | (Yes) or No | (Circle One) |
| Very Small Business Enterprise (VSBE) | Yes or (No) | (Circle One) |

Is your firm a DVBE MBE WBE X OBE (Circle at least one)

Signature _____ Title President

Printed Name Elliot Granstrom Date Signed 12/19/2025

NOTARY

State of California

County of Los Angeles

CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION

On 12/19/2025 (Date) before me, Sarah Manjarrez | Notary (Here Insert Name and Title of the Officer)

personally appeared Elliot Gran Strom (Name(s) of Signer(s))

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

SARAH NICOLE MANJARREZ
Notary Public - California
Los Angeles County
Commission # 2517756
My Comm. Expires Apr 19, 2029

WITNESS my hand and official seal.

Place Notary Seal Above Signature Sarah M

Signature of Notary Public

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Subcontractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm Integrity Rebar Placers

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| | | |
|---|---|---|
| Small Business Enterprise (SBE) | Yes or No | (Circle One) |
| Very Small Business Enterprise (VSBE) | Yes or No | (Circle One) |

Is your firm a DVBE (MBE) WBE OBE (Circle at least one)

Signature _____ Title President

Printed Name Ken Negrete Date Signed 12/23/25

NOTARY

State of California

County of Riverside

## ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Riverside )

On December 23, 2023 before me, L. Robinson, Notary Public
(insert name and title of the officer)

personally appeared Ken Negrete,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

RRS2 L. ROBINSON RRS2
COMM. # 2491778
NOTARY PUBLIC-CALIFORNIA
RIVERSIDE COUNTY
MY COMM. EXP. JUNE 1, 2028

Signature _____ (Seal)

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm Jilk Heavy Construction, Inc.

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| | | |
|---|---|---|
| Small Business Enterprise (SBE) | Yes or No | (Circle One) |
| Very Small Business Enterprise (VSBE) | Yes or No | (Circle One) |

Is your firm a DVBE MBE WBE OBE (Circle at least one)

Signature _____ Title Chief Financial Officer

Printed Name Jeremiah Jilk Date Signed December 22, 2025

NOTARY

State of California

County of _____

On _____ before me, _____
Date Here insert Name and Title of the Officer

personally appeared _____
Name(s) of Signer(s)

---

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Place Notary Seal Above Signature_____

_____
Signature of Notary Public

**CALIFORNIA ACKNOWLEDGMENT** CIVIL CODE § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Orange

On December 23, 2026 *Date* before me, Anna Lisa Paila, Notary Public *Here Insert Name and Title of the Officer*,

personally appeared Jeremiah Jilk *Name(s) of Signer(s)*,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

ANNA LISA PAILA
Notary Public - California
Orange County
Commission # 2487207
My Comm. Expires May 14, 2028

*Place Notary Seal and/or Stamp Above*

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____
*Signature of Notary Public*

**OPTIONAL**

*Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: Jeremiah Jilk | Signer's Name: |
| ☒ Corporate Officer – Title(s): Chief Financial Officer | ☐ Corporate Officer – Title(s): |
| ☐ Partner – ☐ Limited ☐ General | ☐ Partner – ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: | ☐ Other: |
| Signer is Representing: Jilk Heavy Construction, Inc. | Signer is Representing: |

©2019 National Notary Association

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm KPA Constructors Inc.

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| | | |
|---|---|---|
| Small Business Enterprise (SBE) | (Yes) or No | (Circle One) |
| Very Small Business Enterprise (VSBE) | (Yes) or No | (Circle One) |

Is your firm a DVBE (MBE) WBE OBE (Circle at least one)

Signature _____ Title President

Printed Name Karl Percell II Date Signed 12/23/2025

NOTARY

State of California

County of Los Angeles

On December 23, 2025 before me, Brian E. Bates Notary Public
Date Here insert Name and Title of the Officer

personally appeared Karl Percell II
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

NPC1 BRIAN E. BATES COMM. #2468520 NOTARY PUBLIC- CALIFORNIA LOS ANGELES COUNTY My Comm. Expires Oct 27, 2027 NPC1

"See Attached Notarial Certificate"

Place Notary Seal Above Signature

Signature of Notary Public

**CALIFORNIA ACKNOWLEDGMENT** CIVIL CODE § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Los Angeles

On December 23 2025 before me, Brian E. Bates, Notary Public,
*Date* *Here Insert Name and Title of the Officer*

personally appeared Karl Percell II
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

BRIAN E. BATES
COMM. #2468520
NOTARY PUBLIC- CALIFORNIA
LOS ANGELES COUNTY
My Comm. Expires Oct 27, 2027

*Place Notary Seal and/or Stamp Above*

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature B. E. Bates
*Signature of Notary Public*

**OPTIONAL**

*Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: Affidavit

Document Date: 12/23/25 Number of Pages: 2

Signer(s) Other Than Named Above:

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: Karl Percell II | Signer's Name: |
| ☒ Corporate Officer – Title(s): president | ☐ Corporate Officer – Title(s): |
| ☐ Partner – ☐ Limited ☐ General | ☐ Partner – ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: | ☐ Other: |
| Signer is Representing: | Signer is Representing: |

©2019 National Notary Association

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Subcontractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm MSL Electric Inc.

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| | | |
|---|---|---|
| Small Business Enterprise (SBE) | Yes or (No) | (Circle One) |
| Very Small Business Enterprise (VSBE) | Yes or (No) | (Circle One) |

Is your firm a DVBE MBE WBE (OBE) (Circle at least one)

Signature _____ Title VP Operations

Printed Name James Varnes Date Signed 12-23-25

NOTARY

State of California

County of Orange

On December 23, 2025 before me, Patricia Anne Morris, Notary Public
Date Here insert Name and Title of the Officer

personally appeared James Varnes
Name(s) of Signer(s)

---

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

PATRICIA ANNE MORRIS
Notary Public - California
Orange County
Commission # 2518321
My Comm. Expires Apr 25, 2029

Place Notary Seal Above Signature

Signature of Notary Public

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm
George Jue Manufacturing Company, Inc. dba: Paramount Metal & Supply Co.

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

Small Business Enterprise (SBE) (Yes) or No (Circle One)
Very Small Business Enterprise (VSBE) Yes or No (Circle One)

Is your firm a DVBE MBE WBE OBE (Circle at least one)

Signature _____ Title Controller

Printed Name Mathew P Guerrero Date Signed 23 December 2025

**State of California**
**NOTARIAL ACKNOWLEDGEMENT**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document, to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Los Angeles )

On 23 December 2025 before me, Leonor V Silva ,a Notary Public
(enter name of notary)

personally appeared Mathew P Guerrero ,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies) and that by his/her/their signature on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

_____ **(seal)**
Signature

LEONOR V. SILVA
Notary Public - California
Los Angeles County
Commission # 2479126
My Comm. Expires Feb 5, 2028

On _____ before me, _____
Date Here insert Name and Title of the Officer

personally appeared _____
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Place Notary Seal Above Signature_____

_____
Signature of Notary Public

CALIFORNIA SECRETARY OF STATE ACCEPTABLE NOTARY DOCUMENT IS ATTACHED TO PAGE 3 OF AFFIDAVIT

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm Pure Effect, Inc.

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| | | |
|---|---|---|
| Small Business Enterprise (SBE) | Yes or No | (Circle One) |
| Very Small Business Enterprise (VSBE) | Yes or No | (Circle One) |

Is your firm a DVBE MBE WBE OBE (Circle at least one)

Signature Jeanne Anderson Title Controller

Printed Name Jeanne Anderson Date Signed 12/23/2025

NOTARY

State of California

County of Orange

On Dec 23 2025 before me, Regina Arrua
Date Here Insert Name and Title of the Officer

personally appeared Jeanne Anderson
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

REGINA ARRUA
Notary Public - California
Orange County
Commission # 2491983
My Comm. Expires Jun 6, 2028

WITNESS my hand and official seal.

Place Notary Seal Above Signature

Signature of Notary Public

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Subcontractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm Schwager Davis, Inc. (SDI)

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

Small Business Enterprise (SBE) NO (Circle One)
Very Small Business Enterprise (VSBE) NO (Circle One)

Is your firm a DVBE MBE WBE OBE N/A (Circle at least one)

Signature _____ Title President

Printed Name Mike Schwager Date Signed 12/22/2025

NOTARY

State of California

County of _____

**A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.**

**State of California**
**County of** Santa Clara
**Subscribed and sworn to (or affirmed) before me on this** 22 **day of** Dec, 2025, **by** Mike Schwager, **proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.**
**Signature** _____ **(Seal)**

LORI ROSELL
Notary Public - California
Santa Clara County
Commission # 2526156
My Comm. Expires Jul 5, 2029

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Subcontractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm Shaw & Sons, Inc.

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| | | |
|---|---|---|
| Small Business Enterprise (SBE) | Yes or (No) | (Circle One) |
| Very Small Business Enterprise (VSBE) | Yes or (No) | (Circle One) |

Is your firm a DVBE MBE WBE (OBE) (Circle at least one)

Signature _____ Title President

Printed Name Jeff Counterman Date Signed 12/22/2025

~~NOTARY~~

State of California

County of _____

See attached Notary Certificate

**CALIFORNIA ACKNOWLEDGMENT** CIVIL CODE § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Orange }

On December 24, 2025 before me, Rebecca L. Berg - Notary Public,
*Date* *Here Insert Name and Title of the Officer*

personally appeared Jeff Counterman
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

REBECCA L. BERG
Notary Public - California
Orange County
Commission # 2442818
My Comm. Expires Apr 25, 2027

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Rebecca L. Berg
*Signature of Notary Public*

*Place Notary Seal and/or Stamp Above*

**OPTIONAL**

*Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**
Title or Type of Document: Subcontractor Ownership Affidavit
Document Date: 12/24/25 Number of Pages: 1
Signer(s) Other Than Named Above: None

**Capacity(ies) Claimed by Signer(s)**

| | |
|---|---|
| Signer's Name: Jeff Counterman | Signer's Name: |
| ☑ Corporate Officer – Title(s): President | ☐ Corporate Officer – Title(s): |
| ☐ Partner – ☐ Limited ☐ General | ☐ Partner – ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☐ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: | ☐ Other: |
| Signer is Representing: Shaw & Sons, Inc | Signer is Representing: |

©2019 National Notary Association

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Subcontractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm **SpectraSystems, Inc. dba SpectraTurf**

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| | | |
|---|---|---|
| Small Business Enterprise (SBE) | Yes or (No) | (Circle One) |
| Very Small Business Enterprise (VSBE) | Yes or (No) | (Circle One) |

Is your firm a DVBE MBE WBE (OBE) (Circle at least one)

Signature Daniel Heimann Title Corp. Secretary

Printed Name Daniel Heimann Date Signed 12/22/2025

NOTARY

State of California

County of Riverside

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )
County of Riverside )

On 12/22/2025 before me, D.Reyes, Notary Public,
*Date* *Here Insert Name and Title of the Officer*

personally appeared Daniel Hermann,
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

D.REYES
COMM. #2499558
Notary Public - California
RIVERSIDE COUNTY
My Comm. Expires OCT. 07, 2028

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____
*Signature of Notary Public*

*Place Notary Seal Above*

**OPTIONAL**

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**
Title or Type of Document: Contractor/Subcontractor/Supplier Information Document Date: 12/22/2025
Number of Pages: 1 Signer(s) Other Than Named Above: _____

**Capacity(ies) Claimed by Signer(s)**

| Signer's Name: | Signer's Name: |
|---|---|
| ☐ Corporate Officer — Title(s): | ☐ Corporate Officer — Title(s): |
| ☐ Partner — ☐ Limited ☐ General | ☐ Partner — ☐ Limited ☐ General |
| ☐ Individual ☐ Attorney in Fact | ☑ Individual ☐ Attorney in Fact |
| ☐ Trustee ☐ Guardian or Conservator | ☐ Trustee ☐ Guardian or Conservator |
| ☐ Other: | ☐ Other: |
| Signer Is Representing: | Signer Is Representing: |

On _____ before me, _____
Date Here insert Name and Title of the Officer

personally appeared _____
Name(s) of Signer(s)

_____

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Place Notary Seal Above Signature_____

_____
Signature of Notary Public

**See Attached Certificate**

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm
Aro Industries Inc., dba Summit Environmental Contractors
as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| | | |
|---|---|---|
| Small Business Enterprise (SBE) | Yes or No | (Circle One) |
| Very Small Business Enterprise (VSBE) | Yes or No | (Circle One) |

Is your firm a DVBE MBE WBE OBE (Circle at least one)

Signature Grace Joanne Title President / C.E.O.

Printed Name Grace Anonne Date Signed 12-23-25

NOTARY

State of California

County of _____

# CALIFORNIA ALL- PURPOSE CERTIFICATE OF ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California }

County of Orange }

On 12/23/2025 before me, HEMANSHU P. BADANI, Notary Public
(Here insert name and title of the officer),

personally appeared GRACE ARONNE,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that ~~he~~/she/~~they~~ executed the same in ~~his~~/her/~~their~~ authorized capacity(~~ies~~), and that by ~~his~~/her/~~their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Notary Public Signature (Notary Public Seal)

RRS2 HEMANSHU P. BADANI COMM. # 2415414 NOTARY PUBLIC-CALIFORNIA ORANGE COUNTY MY COMM. EXP. OCT 7, 2026 RRS2

## ADDITIONAL OPTIONAL INFORMATION

DESCRIPTION OF THE ATTACHED DOCUMENT

Ownership Affidavit
(Title or description of attached document)

(Title or description of attached document continued)

Number of Pages ____ Document Date____

CAPACITY CLAIMED BY THE SIGNER

- ☐ Individual (s)
- ☐ Corporate Officer
  (Title)
- ☐ Partner(s)
- ☐ Attorney-in-Fact
- ☐ Trustee(s)
- ☐ Other ____

INSTRUCTIONS FOR COMPLETING THIS FORM

*This form complies with current California statutes regarding notary wording and, if needed, should be completed and attached to the document. Acknowledgments from other states may be completed for documents being sent to that state so long as the wording does not require the California notary to violate California notary law.*

- State and County information must be the State and County where the document signer(s) personally appeared before the notary public for acknowledgment.
- Date of notarization must be the date that the signer(s) personally appeared which must also be the same date the acknowledgment is completed.
- The notary public must print his or her name as it appears within his or her commission followed by a comma and then your title (notary public).
- Print the name(s) of document signer(s) who personally appear at the time of notarization.
- Indicate the correct singular or plural forms by crossing off incorrect forms (i.e. ~~he~~/she/~~they,~~ is /~~are~~ ) or circling the correct forms. Failure to correctly indicate this information may lead to rejection of document recording.
- The notary seal impression must be clear and photographically reproducible. Impression must not cover text or lines. If seal impression smudges, re-seal if a sufficient area permits, otherwise complete a different acknowledgment form.
- Signature of the notary public must match the signature on file with the office of the county clerk.
  - ❖ Additional information is not required but could help to ensure this acknowledgment is not misused or attached to a different document.
  - ❖ Indicate title or type of attached document, number of pages and date.
  - ❖ Indicate the capacity claimed by the signer. If the claimed capacity is a corporate officer, indicate the title (i.e. CEO, CFO, Secretary).
- Securely attach this document to the signed document with a staple.

On _____ before me, _____
Date Here insert Name and Title of the Officer

personally appeared _____
Name(s) of Signer(s)

---

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Place Notary Seal Above Signature_____

_____
Signature of Notary Public

## 02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AFFIDAVIT

AFFIDAVIT

"The undersigned declares under penalty of perjury pursuant to the laws of the State of California that the following information and information contained on the attached Contractor/Supplier Information Form is true and correct and includes all material information necessary to identify and explain the operations of

Name of Firm Techno Coatings, Inc 785 E. Debra LN Anaheim CA 92805

as well as the ownership thereof. Further, the undersigned agrees to provide, upon request, either through the prime contractor or, directly to Harbor Department, complete and accurate information regarding ownership in the named firm, and all of its domestic and foreign affiliates, any proposed changes of the ownership and to permit the audit and examination of firm ownership documents, and the ownership documents of all of its domestic and foreign affiliates, in association with this Contract."

Please indicate the ownership of your company as defined in Subsection 00030.06 of BIDDING DOCUMENTS Section:

| | | |
|---|---|---|
| Small Business Enterprise (SBE) | Yes or No | (Circle One) |
| Very Small Business Enterprise (VSBE) | Yes or No | (Circle One) |

Is your firm a DVBE MBE WBE OBE (Circle at least one)

Signature _____ Title PRESIDENT, COO

Printed Name CHRIS PALICKE Date Signed 12/23/25

NOTARY

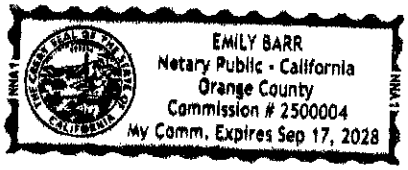
State of California

County of orange

On December 23, 2025 before me, Emily Barr, Notary Public
Date Here insert Name and Title of the Officer

personally appeared Chris Palicke
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.




I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Place Notary Seal Above Signature Emily Barr

Signature of Notary Public

03 SUPPLIER LIST

Supplier information is required for calculation of SBE and VSBE participation. Photocopy this form for additional firms. Please list SBE and VSBE Suppliers that are being used to achieve the minimum required SBE and VSBE participation levels.

| Supplier Name and Location | | Amount | SBE Yes or No | VSBE Yes or No | Local Business Yes or No |
|---|---|---|---|---|---|
| Name | NA | | | | |
| Address | | | | | |
| City, State, Zip | | | | | |
| Phone | | | | | |
| Description of Items Being Supplied: | | | | | |
| Quality | | | | | |
| | | | | | |
| Name | | | | | |
| Address | | | | | |
| City, State, Zip | | | | | |
| Phone | | | | | |
| Description of Items Being Supplied: | | | | | |
| | | | | | |
| | | | | | |
| Name | | | | | |
| Address | | | | | |
| City, State, Zip | | | | | |
| Phone | | | | | |
| Description of Items Being Supplied: | | | | | |
| Job Coordinator | | | | | |
| | | | | | |
| SUBTOTAL | DEPARTMENT USE ONLY | | | | |
| | | | | | |

END OF SECTION

FORM 50

# Bidder Certification

Los Angeles City ETHICS COMMISSION

This form must be submitted with your bid or proposal to the City department that is awarding the contract noted below. If you have questions about this form, please contact the Ethics Commission at (213) 978-1960.

☑ **Original Filing** ☐ **Amendment:** Date of Signed Original _____. Date of Last Amendment _____.

| Reference Number (Bid, Contract, or RAMP) | Awarding Authority (Department awarding the contract) |
|---|---|
| 2804A | Port of Los Angeles, CDBON |
| **Bidder Name** | |
| Skanska USA Civil West California District Inc. | |
| **Address** | |
| 1995 Agua Mansa Road, Riverside, CA 92509 | |
| **Email Address** | **Phone Number** |
| James.Bailey@skanska.com | (951) 684-5360 |

## Certification

I certify the following on my own behalf or on behalf of the entity named above, which I am authorized to represent:

A. I am applying for one of the following types of contracts with the City of Los Angeles:

1. A goods or services contract with a value of more than $25,000 and a term of at least three months;
2. A construction contract with any value and duration;
3. A financial assistance contract, as defined in Los Angeles Administrative Code § 10.40.1(h), with a value of at least $100,000 and a term of any duration; or
4. A public lease or license, as defined in Los Angeles Administrative Code § 10.40.1(i), with any value and duration.

B. I acknowledge and agree to comply with the disclosure requirements and prohibitions established in the Los Angeles Municipal Lobbying Ordinance if I qualify as a lobbying entity under Los Angeles Municipal Code § 48.02.

I certify under penalty of perjury under the laws of the City of Los Angeles and the state of California that the information in this form is true and complete.

James Bailey
Name

J. Bailey
Signature

Executive Vice President
Title

12/22/2025
Date

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

This form must be completed in its entirety and submitted with your bid or proposal to the City department that is awarding the contract. Failure to submit a completed form may affect your bid or proposal. If you have questions about this form, please contact the Ethics Commission at (213) 978-1960.

☑ **Original Filing** ☐ **Amendment:** Date of Signed Original _____. Date of Last Amendment _____.

Reference Number (Bid, Contract, or RAMP): 2804A Date Bid Submitted: 12/22/2025

Contract Description (Title of the RFP or City contract solicitation and description of the services to be provided):
Avalon Pedestrian Bridge and Promenade Gateway

Awarding Authority (Department awarding the contract): Port of Los Angeles, CDBON

Bidder Name: Skanska USA Civil West California District Inc.

Bidder Address: 1995 Agua Mansa Road, Riverside, CA 92509

Bidder Email Address: James.Bailey@skanska.com Bidder Phone Number: (951) 684-5360

## Schedule Summary

Please complete all three of the following:

| | Yes | No |
|---|---|---|
| 1. **SCHEDULE A — Bidder's Principals** *(check one)*<br>The bidder has one or more **PRINCIPALS,** as defined in LAMC § 49.7.35(A)(6).<br>At least one principal is required for entities. *(If you check "Yes", Schedule A is required.)* | ☑ | ☐ |
| 2. **SCHEDULE B — Subcontractors and Their Principals** *(check one)*<br>The bidder has one or more **SUBCONTRACTORS** on this bid or proposal with subcontracts worth $100,000 or more. *(If you check "Yes", Schedule B is required.)* | ☑ | ☐ |

3. **TOTAL NUMBER OF PAGES SUBMITTED** (including this cover page): _____

## Certification

I certify the following under penalty of perjury under the laws of the City of Los Angeles and the state of California:
A) I understand, will comply with, and have notified my principals and subcontractors of the requirements and restrictions in Los Angeles City Charter § 470(c)(12) and any related ordinances; B) I understand that I must amend this form within ten business days if any information changes; C) I am the bidder named above or I am authorized to represent the bidder named above, and my name appears below; and D) The information provided in this form is true and complete to the best of my knowledge and belief.

James Bailey
Name

J. Bailey
Signature

Executive Vice President
Title

12/22/2025
Date

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule A - Bidder's Principals

Please identify the names and titles of all the bidder's principals (attach additional sheets if necessary). Principals include a bidder's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the bidder of at least 20 percent and employees of the bidder who are authorized by the bid or proposal to represent the bidder before the City.

Name: James Bailey Title: Executive Vice President
Address: 1995 Agua Mansa Road, Riverside, California 92509

Name: Ryan Clayton Title: Senior Vice President
Address: 1995 Agua Mansa Road, Riverside, California 92509

Name: Tony Taddeo Title: Senior Vice President
Address: 1995 Agua Mansa Road, Riverside, California 92509

Name: Brett Bockmann Title: Vice President, Secretary/Treasurer
Address: 1995 Agua Mansa Road, Riverside, California 92509

Name: _____ Title: _____
Address: _____

Name: _____ Title: _____
Address: _____

Name: _____ Title: _____
Address: _____

Name: _____ Title: _____
Address: _____

Name: _____ Title: _____
Address: _____

☐ Check this box if additional Schedule A pages are attached.

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

| Subcontractor's Name |
| --- |
| Subcontractor's Address |

Please check one of the following options:

**This subcontractor has one or more principals.** ☐ Yes* ☐ No

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

☒ Check this box if additional Schedule B pages are attached.

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

Ace Fence Company

Subcontractor's Address

727 Glendora Ave., La Puente, CA 91744

Please check one of the following options:

**This subcontractor has one or more principals.** ☒ Yes* ☐ No

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Amy Tsui Title: President
Address: 727 Glendora Ave., La Puente, CA 91744

Name: America Tang Title: Secratary
Address: 727 Glendora Ave., La Puente, CA 91744

Name: Wayne Wong Title: Treasurer
Address: 727 Glendora Ave., La Puente, CA 91744

Name: Title:
Address:

Name: Title:
Address:

Name: Title:
Address:

☐ **Check this box if additional Schedule B pages are attached.**

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name
Arc Ventures

Subcontractor's Address
1100 S Hope St #1203 Los Angeles, CA 90015

Please check one of the following options:

This subcontractor has one or more principals. [X] Yes* [ ] No

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Lucas Silva Title: President
Address: 1100 S Hope St #1203 Los Angeles, CA 90015

Name: Mason Miller Title: VP/Corp Sec
Address: 1100 S Hope St #1203 Los Angeles, CA 90015

Name: Title:
Address:

Name: Title:
Address:

Name: Title:
Address:

Name: Title:
Address:

[ ] Check this box if additional Schedule B pages are attached.

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

Cicero Engineering Inc.

Subcontractor's Address

3920 Valley Blvd, Unit A Walnut, CA 91789

Please check one of the following options:

**This subcontractor has one or more principals.** ☑ **Yes*** ☐ **No**

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Frank Cicero Title: Pres/VP/Secty/Treasurer

Address: 3920 Valley Blvd, Unit A Walnut, CA 91789

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

☐ **Check this box if additional Schedule B pages are attached.**

FORM 55

# Prohibited Contributors
(Bidders)

## Schedule B - Subcon[illegible]

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

| Subcontractor's Name |
| --- |
| Granstrom Masonry Inc |
| **Subcontractor's Address** |
| PO Box 7041, Torrance, CA, 90504 |

Please check one of the following options.

**This subcontractor has one or more principals.** [X] Yes* [ ] No

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Elliot Granstrom Title: President
Address: PO Box 7041, Torrance, CA, 90504

Name: Thomas Granstrom Title: Vice President
Address: PO Box 7041, Torrance, CA, 90504

Name: Sharon Granstrom Title: Secretary / Treasurer
Address: PO Box 7041, Torrance, CA, 90504

Name: Title:
Address:

Name: Title:
Address:

Name: Title:
Address:

[ ] **Check this box if additional Schedule B pages are attached.**

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

Integrity Rebar Placers

Subcontractor's Address

1345 Nandina Ave. Perris, CA 92571

Please check one of the following options:

**This subcontractor has one or more principals.** [x] Yes* [ ] No

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Ken Negrete Title: President

Address: 25740 Douglas Ave Murrieta 92562

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

[ ] Check this box if additional Schedule B pages are attached.

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

Jilk Heavy Construction, Inc.

Subcontractor's Address

500 S Kraemer Blvd., Suite 380, Brea, CA 92821

Please check one of the following options:

**This subcontractor has one or more principals.** ☑ Yes* ☐ No

** Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: James Jilk Title: President
Address: 500 S Kraemer Blvd., Suite 380, Brea, CA 92821

Name: Jeremia Jilk Title: Chief Financial Officer
Address: 500 S Kraemer Blvd., Suite 380, Brea, CA 92821

Name: Joshua Jilk Title: Vice President
Address: 500 S Kraemer Blvd., Suite 380, Brea, CA 92821

Name: Title:
Address:

Name: Title:
Address:

Name: Title:
Address:

☐ **Check this box if additional Schedule B pages are attached.**

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

KPA Constructors Inc

Subcontractor's Address

40 N Altadena Drive, Ste 206, Pasadena, CA, 91107

Please check one of the following options:

**This subcontractor has one or more principals.** ☑ **Yes*** ☐ **No**

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Karl Percell II Title: President

Address: 40 N Altadena Drive, Ste 206, Pasadena, CA, 91107

Name: Kit Wong Title: Vice President

Address: 40 N Altadena Drive, Ste 206, Pasadena, CA, 91107

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

☐ **Check this box if additional Schedule B pages are attached.**

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

Malcolm Drilling Company, Inc

Subcontractor's Address

4926 N. Azusa Canyon Road, Irwindale, CA 91706

Please check one of the following options:

**This subcontractor has one or more principals.** ☑ **Yes*** ☐ **No**

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Brcok Nieuwkoop Title: District Manager/Vice President

Address: 4926 N. Azusa Canyon Road, Irwindale, CA 91706

Name: John M. Malcolm Title: Owner/Chairman of the Board/CEO

Address: 4926 N. Azusa Canyon Road, Irwindale, CA 91706

Name: Jason W. Malcolm Title: President/COO

Address: 4926 N. Azusa Canyon Road, Irwindale, CA 91706

Name: Derek Yamashita Title: CFO/Treasurer/Secretary

Address: 4926 N. Azusa Canyon Road, Irwindale, CA 91706

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

☐ **Check this box if additional Schedule B pages are attached.**

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

MSL Electric, Inc.

Subcontractor's Address

2918 E La Jolla St., Anaheim, CA 92806

Please check one of the following options:

**This subcontractor has one or more principals.** [X] **Yes*** [ ] **No**

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Warren L. Moore Title: President
Address: 2918 E La Jolla St., Anaheim, CA 92806

Name: Sally M. Moore Title: Vice President/Secretary
Address: 2918 E La Jolla St., Anaheim, CA 92806

Name: James Varnes Title: VP Operations
Address: 2918 E. La Jolla St. Anaheim Ca. 92806

Name: Title:
Address:

Name: Title:
Address:

Name: Title:
Address:

[ ] **Check this box if additional Schedule B pages are attached.**

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

George Jue Mfg. Co., Inc. dba: Paramount Metal & Supply Co.

Subcontractor's Address

Please check one of the following options:

**This subcontractor has one or more principals.** ☑ **Yes*** ☐ **No**

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: REGINALD JUE Title: BOARD CHAIR
Address: 8140 ROSECRANS AVE., PARAMOUNT, CA 90723

Name: LEONOR SILVA Title: PRESIDENT
Address: 8140 ROSECRANS AVE., PARAMOUNT, CA 90723

Name: MAUREEN DRURY Title: CFO
Address: 8140 ROSECRANS AVE., PARAMOUNT, CA 90723

Name: VINCENT JUE Title: DIRECTOR
Address: 8140 ROSECRANS AVE., PARAMOUNT, CA 90723

Name: MATHEW GUERRERO Title: CORPORATE CONTROLLER
Address: 8140 ROSECRANS AVE., PARAMOUNT, CA 90723

Name: DON LEUNG Title: SENIOR ESTIMATOR/PROJECT MGR
Address: 8140 ROSECRANS AVE., PARAMOUNT, CA 90723

☐ **Check this box if additional Schedule B pages are attached.**

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

Pure Effect, Inc

Subcontractor's Address

601 W Valencia Dr. Fullerton CA 92832

Please check one of the following options:

**This subcontractor has one or more principals.** ☐ **Yes*** ☑ **No**

** Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Robert Robinson Title: President

Address: 601 W Valencia Dr. Fullerton, CA 92832

Name: James Kreider Title: Vice President

Address: 601 W Valencia Dr. Fullerton, CA 92832

Name: Paul Lanhardt Title: Business Development

Address: 601 W Valencia Dr. Fullerton, CA 92832

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

☐ **Check this box if additional Schedule B pages are attached.**

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name
Schwager Davis, Inc. (SDI)

Subcontractor's Address
198 Hillsdale Ave., San Jose, CA 95136

Please check one of the following options:

**This subcontractor has one or more principals.** X Yes* ☐ No

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Guido Schwager Title: Chairman
Address: 198 Hillsdale Ave., San Jose, CA 95136

Name: Mike Schwager Title: President
Address: 198 Hillsdale Ave., San Jose, CA 95136

Name: _____ Title: _____
Address: _____

Name: _____ Title: _____
Address: _____

Name: _____ Title: _____
Address: _____

Name: _____ Title: _____
Address: _____

☐ Check this box if additional Schedule B pages are attached.

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

Shaw & Sons Inc.

Subcontractor's Address

829 W. 17th Street, Ste 5, Costa Mesa, CA 92627

Please check one of the following options:

**This subcontractor has one or more principals.** [X] Yes* [ ] No

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Jill Shaw Title: CEO

Address: 829 W. 17th Street, Ste 5, Costa Mesa, CA 92627

Name: Jeff Counterman Title: President / CFO

Address: 829 W. 17th Street, Ste 5, Costa Mesa, CA 92627

Name: Ryan Rood Title: Vice President

Address: 829 W. 17th Street, Ste 5, Costa Mesa, CA 92627

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

[ ] Check this box if additional Schedule B pages are attached.

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

Sierra Landscape Development, Inc.

Subcontractor's Address

2209 1/2 Chico Ave. South El Monte, CA 91733

Please check one of the following options:

**This subcontractor has one or more principals.** ☑ **Yes*** ☐ **No**

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Kevin J. Watchler Title: President

Address: 878 E. Manresa Dr. Azusa, CA 91702

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

☐ **Check this box if additional Schedule B pages are attached.**

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

SpectraTurf

Subcontractor's Address

555 S. Promenade Ave #103, Corona, CA 92879

Please check one of the following options:

**This subcontractor has one or more principals.** ☑ **Yes*** ☐ **No**

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Arthur B Dodge III Title: President / CEO

Address: Ecore International; 715 Fountain Avenue, Lancaster, PA 17603

Name: Lisa Anderson Title: Chief Commercial Officer- Outdoor Surfacing

Address: 555 S. Promenade Ave., Suite 103, Corona, CA 92879

Name: Chris Anderson Title: Operations Manager

Address: 555 S. Promenade Ave., Suite 103, Corona, CA 92879

Name: Title:

Address:

Name: Title:

Address:

Name: Title:

Address:

☐ **Check this box if additional Schedule B pages are attached.**

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

Aro Industries dba Summit Environmental Contractors

Subcontractor's Address

33161 Camino Capistrano Ste. F San Juan Capistrano, CA 92675

Please check one of the following options:

**This subcontractor has one or more principals.** ☐ Yes* ☑ No

** Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Grace Aronne Title: CEO/President

Address: 33161 Camino Capistrano Ste. F San Juan Capistrano, CA. 92675

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

Name: _____ Title: _____

Address: _____

☐ **Check this box if additional Schedule B pages are attached.**

FORM 55

# Prohibited Contributors
(Bidders)

Los Angeles City ETHICS COMMISSION

## Schedule B - Subcontractors and Their Principals

Please identify all subcontractors whose subcontracts are worth $100,000 or more. Separate Schedule B pages are required for each subcontractor who meets the threshold.

Subcontractor's Name

Techno Coatings, Inc

Subcontractor's Address

785 E. Debra Ln Anaheim, CA 92805

Please check one of the following options:

**This subcontractor has one or more principals.** ☑ Yes* ☐ No

* *Each principal's name and title must be identified below. Attach additional sheets if necessary. Principals include a subcontractor's board chair, president, chief executive officer, chief operating officer, and individuals who serve in the functional equivalent of one or more of those positions. Principals also include individuals who hold an ownership interest in the subcontractor of at least 20 percent and employees of the subcontractor who are authorized by the bid or proposal to represent the subcontractor before the City.*

Name: Alan Pott Title: CEO
Address: 785 E. Debra LN Anaheim, CA 92805

Name: Chris Palicke Title: President & COO
Address: 785 E. Debra LN Anaheim, CA 92805

Name: Shelley Fajardo Title: Controller
Address: 785 E. Debra LN Anaheim, CA 92805

Name: Tom Unsell Title: Senior Vice President
Address: 785 E. Debra LN Anaheim, CA 92805

Name: Title:
Address:

Name: Title:
Address:

☐ **Check this box if additional Schedule B pages are attached.**

Printed on: 12/22/2025 8:46:45 AM

To verify most current certification status go to: https://www.caleprocure.ca.gov

DGS
CALIFORNIA DEPARTMENT OF
GENERAL SERVICES

# Office of Small Business & DVBE Services

**Certification ID:** 1788858

**Legal Business Name:**
AZ Construction, Inc.

**Doing Business As (DBA) Name 1:**
Ace Fence Co.

**Doing Business As (DBA) Name 2:**
Ace Fence Company

**Address:**
727 Glendora Ave.
La Puente
CA 91744

**Email Address:**
america@acefencecompany.com

**Business Web Page:**
www.acefencecompany.com

**Business Phone Number:**
626/333-0727

**Business Fax Number:**
626/333-7843

**Business Types:**
Construction , Service

| Certification Type | Status | From | To |
|---|---|---|---|
| SB-PW | Approved | 05/15/2024 | 05/31/2026 |

Stay informed! KEEP YOUR CERTIFICATION PROFILE UPDATED!
-LOG IN at CaleProcure.CA.GOV

Questions?
Email: Certification@dgs.ca.gov
Call OSDS Main Number: 916-375-4940
707 3rd Street, 1-400, West Sacramento, CA 95605

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

Metro

April 18, 2025

**Metro File #10190**

Mr. Lucas Silva
Arc Ventures
1100 S Hope St
#1203
Los Angeles, CA 90015

Subject: Small Business Enterprise Certification

Dear Mr. Lucas Silva:

Congratulations, and thank you for your interest in the SBE program. We are pleased to advise you that after a thorough review of your application and supporting documentation, the Los Angeles County Metropolitan Transportation Authority (Metro) has determined that your firm meets the certification eligibility guidelines as outlined in Metro's SBE Program. Your firm will be listed in Metro's database of certified SBEs under the following areas of expertise:

NAICS 237110: WATER AND SEWER LINE AND RELATED STRUCTURES CONSTRUCTION
NAICS 237990: OTHER HEAVY AND CIVIL ENGINEERING CONSTRUCTION
NAICS 238110: POURED CONCRETE FOUNDATION AND STRUCTURE CONTRACTORS

Your SBE certification applies only for the North American Industry Classification System (NAICS) codes listed above. You may review your firm's information in Metro's SBE database at https://smallbusinessquery.metro.net. Any additions and/or revisions must be submitted to Metro for review and approval.

In order to ensure your continued SBE status, Metro requires all SBE certified firms to update their certification annually. A Declaration of Eligibility (DOE), along with supporting documentation, must be submitted by the anniversary date of your firm's certification. If no changes are noted, then your SBE status remains current. If there are changes, Metro will conduct a review to determine continued SBE eligibility. Please note, your SBE status remains in effect unless Metro notifies you otherwise.

Should any changes occur that affect your certification status, such as circumstances affecting your ability to meet size standards, personal net worth, disadvantaged status, ownership, control, or any material changes in the information provided with your application should be immediately disclosed to Metro. Failure to submit annual DOE documentation and/or change of information will be deemed a failure to cooperate and your firm will be removed from the Metro SBE database.

Metro reserves the right to withdraw this certification if at any time it is determined that it was knowingly obtained by false, misleading, or incorrect information. Your SBE certification is subject to a comprehensive review at any time. Should you have any questions, please contact us at 213-922-2600 (Option 1). For information on Metro contracting opportunities, please visit our website at www.metro.net/connect.

Sincerely,

Ramon Ortiz
Director, Certification & Economic Development

Printed on: 12/22/2025 8:41:10 AM

To verify most current certification status go to: https://www.caleprocure.ca.gov

DGS
CALIFORNIA DEPARTMENT OF
GENERAL SERVICES

# Office of Small Business & DVBE Services

**Certification ID:** 1802865

**Legal Business Name:**
CICERO ENGINEERING INC.

**Doing Business As (DBA) Name 1:**

**Doing Business As (DBA) Name 2:**

**Address:**
3920 VALLEY BLVD
UNIT A
WALNUT
CA 91789

**Email Address:**
jmartin@ciceroengineering.com

**Business Web Page:**

**Business Phone Number:**
909/594-9944

**Business Fax Number:**

**Business Types:**
Construction , Service

| Certification Type | Status | From | To |
|---|---|---|---|
| SB | Approved | 10/17/2025 | 10/31/2027 |

Stay informed! KEEP YOUR CERTIFICATION PROFILE UPDATED!
-LOG IN at CaleProcure.CA.GOV

Questions?
Email: Certification@dgs.ca.gov
Call OSDS Main Number: 916-375-4940
707 3rd Street, 1-400, West Sacramento, CA 95605

Printed on: 12/22/2025 11:27:00 AM

To verify most current certification status go to: https://www.caleprocure.ca.gov

DGS
CALIFORNIA DEPARTMENT OF
GENERAL SERVICES

# Office of Small Business & DVBE Services

**Certification ID:** 16143

**Legal Business Name:**
Granstrom Masonry, Inc

**Doing Business As (DBA) Name 1:**

**Doing Business As (DBA) Name 2:**

**Address:**
PO BOX 7041
TORRANCE
CA 90504

**Email Address:**
elliot@granstrommasonry.com

**Business Web Page:**
www.granstrommasonry.com

**Business Phone Number:**
310/327-2527

**Business Fax Number:**
310/515-6330

**Business Types:**
Construction

| Certification Type | Status | From | To |
|---|---|---|---|
| SB(Micro) | Approved | 02/26/2024 | 02/28/2026 |
| SB-PW | Approved | 02/26/2024 | 02/28/2026 |

Stay informed! KEEP YOUR CERTIFICATION PROFILE UPDATED!
-LOG IN at CaleProcure.CA.GOV

Questions?
Email: Certification@dgs.ca.gov
Call OSDS Main Number: 916-375-4940
707 3rd Street, 1-400, West Sacramento, CA 95605

An Official Website of the City of Los Angeles

(https://myla311.lacity.org/) (https://lacity.gov/directory)

Back to search Home > Business Profiles Search > Jilk Heavy Construction, Inc.

# Jilk Heavy Construction, Inc.

**Information**

ID
10282

Registered As
Prime & Sub

Phone
3108306323

Fax
3108352163

Admin
Jeremiah Jilk jeremiah@johnsmeek.com (mailto:jeremiah@johnsmeek.com)

**Addresses**

Website
http://www.jilkhc.com (http://www.jilkhc.com)

Business/Billing
500 S Kraemer Blvd. Suite 360
Brea, CA 92821
United States
(https://www.google.com/maps?q=500%20S%20Kraemer%20Blvd.%20Suite%20360%0ABrea%2C%20CA%2092821%0AUnited%20States)

Summary

| | |
|---|---|
| NAICS Codes | 238990 All Other Specialty Trade Contractors<br>238190 Other Foundation, Structure, and Building Exterior Contractors<br>237990 Other Heavy and Civil Engineering Construction<br>237310 Highway, Street, and Bridge Construction |
| Certifications | LBE (Harbor), SBE (Proprietary), OBE |
| Non-Profit | No |
| Sole Proprietor | No |

** The City of Los Angeles does not endorse, takes no responsibility for, nor exercises control over the information by the linked organizations. The City of Los Angeles is also not responsible for its view, content, nor does it vouch for the accuracy or accessibility of the information. The City of Los Angeles also cannot authorize the use of copyrighted materials containing linked websites. Users must request such information and authorization from the sponsor or owner of the linked website.

Report

## CITY OF LOS ANGELES

City of Los Angeles (https://www.lacity.org)

Mayor's Office of Karen Bass (http://www.lamayor.org)

Open Data (https://data.lacity.org/dataset/RAMP-Open-Bid-Opportunities/hf3r-utnq)

Bond Assistance Program

Building Permits (https://ladbs.org/services/core-services/plan-check-permit)

## BUSINESS SERVICES

Business Source Centers (https://ewddlacity.com/index.php/local-business/businesssource-centers)

Business Tax Resources (https://finance.lacity.org/)

Minority Business Development Agency (https://www.mbda.gov/)

Office of Small Business (https://business.lacity.org/)

City of Los Angeles Green Business Program (https://www.lacitysan.org/san/faces/home/portal/s-lsh-es/s-lsh-es-sl/s-lsh-es-sl-gbc?_adf.ctrl-state=dwqhke9b2_4&_afrLoop=28362735382660796#!)

A SERVICE BROUGHT TO YOU BY

Company Details

User Management

Compliance Documents

Certification

NAICS Codes and Licenses

Bookmarks

BIP Management

Related Opportunities

Contracts

RAMP Support

## KPA Constructors, Inc.

Edit

| Information | Address |
|---|---|
| ID<br>104668 | Business/Billing<br>40 N. Altadena Drive Suite 200<br>Pasadena, CA 91107 |
| Phone<br>(626)348-9650 (tel:8263489650) | Mailing |

Registered as a

Prime & Sub

Non-Profit

No

Sole Proprietor

No

Certification

DBE EBE MBE SBE(LA) SBE(Proprietary) SLB VSBE(Harbor)

Tax ID

82-1201091

License Numbers

A

C10

** The City of Los Angeles does not endorse, takes no responsibility for, nor exercises control over the information by the linked organizations. The City of Los Angeles is also not responsible for its view, content, nor does it vouch for the accuracy or accessibility of the information. The City of Los Angeles also cannot authorize the use of copyrighted materials containing linked websites. Users must request such information and authorization from the sponsor or owner of the linked website.

Printed on: 12/22/2025 3:30:05 PM

To verify most current certification status go to: https://www.caleprocure.ca.gov

DGS
CALIFORNIA DEPARTMENT OF
GENERAL SERVICES

# Office of Small Business & DVBE Services

**Certification ID:** 1467000

**Legal Business Name:**
George Jue Manufacturing Company, Inc

**Doing Business As (DBA) Name 1:**
Paramount Metal & Supply Company

**Doing Business As (DBA) Name 2:**

**Address:**
8140 E ROSECRANS AVE
PARAMOUNT
CA 90723-2754

**Email Address:**
esilva@paramountmetals.com

**Business Web Page:**
www.paramountmetals.com

**Business Phone Number:**
562/634-8180

**Business Fax Number:**

**Business Types:**
Construction , Manufacturer

| Certification Type | Status | From | To |
|---|---|---|---|
| SB-PW | Approved | 02/26/2025 | 02/28/2027 |

Stay informed! KEEP YOUR CERTIFICATION PROFILE UPDATED!
-LOG IN at CaleProcure.CA.GOV

Questions?
Email: Certification@dgs.ca.gov
Call OSDS Main Number: 916-375-4940
707 3rd Street, 1-400, West Sacramento, CA 95605

Printed on: 12/22/2025 11:16:41 AM

To verify most current certification status go to: https://www.caleprocure.ca.gov

DGS
CALIFORNIA DEPARTMENT OF
GENERAL SERVICES

# Office of Small Business & DVBE Services

**Certification ID:** 1796793

**Legal Business Name:**
SIERRA LANDSCAPE DEVELOPMENT, INC.

**Doing Business As (DBA) Name 1:**
SIERRA LANDSCAPE DEVELOPMENT, INC.

**Doing Business As (DBA) Name 2:**

**Address:**
2209 1/2 Chico Ave
CA
South El Monte
CA 91733

**Email Address:**
kevin@sierralandscapedev.com

**Business Web Page:**
www.sierralandscapedev.com

**Business Phone Number:**
626/447-5260

**Business Fax Number:**
626/447-7260

**Business Types:**
Construction , Service

| Certification Type | Status | From | To |
|---|---|---|---|
| SB | Approved | 08/26/2025 | 08/31/2027 |

Stay informed! KEEP YOUR CERTIFICATION PROFILE UPDATED!
-LOG IN at CaleProcure.CA.GOV

Questions?
Email: Certification@dgs.ca.gov
Call OSDS Main Number: 916-375-4940
707 3rd Street, 1-400, West Sacramento, CA 95605

Printed on: 12/22/2025 8:39:08 AM

To verify most current certification status go to: https://www.caleprocure.ca.gov

DGS
CALIFORNIA DEPARTMENT OF
GENERAL SERVICES

# Office of Small Business & DVBE Services

**Certification ID:** 61973

**Legal Business Name:**
ARO INDUSTRIES INC

**Doing Business As (DBA) Name 1:**
SUMMIT ENVIRONMENTAL CONTRACTORS

**Doing Business As (DBA) Name 2:**

**Address:**
33161 CAMINO CAPISTRANO
SUITE F
SAN JUAN CAPISTRANO
CA 92675

**Email Address:**
heather@summitenvironmentalservices.com

**Business Web Page:**
www.summitenvcon.com

**Business Phone Number:**
949/542-4330

**Business Fax Number:**
949/542-4331

**Business Types:**
Construction , Service

| Certification Type | Status | From | To |
|---|---|---|---|
| SB | Approved | 09/08/2025 | 09/30/2027 |
| SB-PW | Approved | 09/08/2025 | 09/30/2027 |

Stay informed! KEEP YOUR CERTIFICATION PROFILE UPDATED!
-LOG IN at CaleProcure.CA.GOV

Questions?
Email: Certification@dgs.ca.gov
Call OSDS Main Number: 916-375-4940
707 3rd Street, 1-400, West Sacramento, CA 95605

Printed on: 12/22/2025 8:40:22 AM

To verify most current certification status go to: https://www.caleprocure.ca.gov

DGS
CALIFORNIA DEPARTMENT OF
GENERAL SERVICES

# Office of Small Business & DVBE Services

**Certification ID:** 2033951

**Legal Business Name:**
Techno Coatings, Inc.

**Doing Business As (DBA) Name 1:**
TECHNO COATINGS, INC.

**Doing Business As (DBA) Name 2:**
TECHNO COATINGS, INC.

**Address:**
785 E. DEBRA LANE
Anaheim
CA 92805

**Email Address:**
shelley@technocoatings.com

**Business Web Page:**
TechnoCoatings.com

**Business Phone Number:**
714/635-1130

**Business Fax Number:**
714/635-6357

**Business Types:**
Construction , Service

| Certification Type | Status | From | To |
|---|---|---|---|
| SB-PW | Approved | 05/30/2025 | 05/31/2027 |

Stay informed! KEEP YOUR CERTIFICATION PROFILE UPDATED!
-LOG IN at CaleProcure.CA.GOV

Questions?
Email: Certification@dgs.ca.gov
Call OSDS Main Number: 916-375-4940
707 3rd Street, 1-400, West Sacramento, CA 95605

01 DRAWINGS

Drawings listed in this Section, together with any drawings, standards, and reports referred to on the listed Drawings, show Work contemplated and are a part of Contract Documents.

| Drawing No. | Title |
|---|---|
| 1-3302A | Avalon Pedestrian Bridge |
| 1-3472A | Avalon Promenade Gateway |

02 REFERENCE REPORTS*

*All Reference Reports listed are available for review in the online bid package. Refer to NOTICE INVITING BIDS Section for more information.

1. Geotechnical Design Report Avalon Promenade Gateway Restroom Building and Electrical Substation prepared by Earth Mechanics, Inc. dated February 2, 2024.
2. Geotechnical Design Report Foundation Support for the Proposed Avalon Promenade Pedestrian Bridge prepared by Earth Mechanics, Inc. dated March 19, 2024.
3. Geotechnical Design Report Avalon Promenade Gateway prepared by Earth Mechanics, Inc. dated January 16, 2025.
4. Soil Management Plan for Avalon Promenade prepared by Verdantas Inc. dated August 6, 2025.

03 REFERENCE DRAWINGS*

*All Reference Drawings listed are available for review in the online bid package. Refer to NOTICE INVITING BIDS Section for more information.

| Drawing No. | Title |
|---|---|
| 1-370-10 | Concrete Wharf Berth-199 Timber Construction |
| 1-584 | Southern Pacific Company – Pacific Lines |
| 1-921-45/1373-4 | Gas Asset Map |
| 1-1536 | Import Automobile Terminal 195 – 199 |
| 1-2607 | Fries Street Outfall Sewer |
| 1-2620 | Fries Avenue District Plan and Profile of Sewers |
| 1-2745 | Spec 2711 Harry Bridges Blvd Voluntary Improvements |
| 1-2881 | Fiber Optic Network Phase 2 |
| 1-3192 | Wilmington Waterfront Promenade |
| 2-0132 | Profile of Marine Ave. from Anaheim St to “A” St |
| 6-993 | Storm Sewer in Canal Ave |
| 28-207 | LADWP Water Service Map |

| | |
|---|---|
| 8325 | Storm Drain Profile of Avlon Blvd |
| 11850-3 | Water Service Map |
| 11925 | Berth 195 – 198 Pylon & Wrought Iron |
| 12461 | Canal Avenue District Plan and Profiles of Sewers |
| 13541 | Gulf Avenue District Plan and Profiles of Sewers |
| 14443 | Storm Drain Profile of Canal Avenue |
| 20132 | Storm Drain Profile of Marine Avenue |
| 26648 | Storm Sewer in Avalon Blvd |
| 30296 | Harry Bridges Boulevard & Neptune Ave |
| A403C29 | The Pacific Tel. And Tel. Co. |
| B-700 | Water mains, services fire hydrants |
| B-2974 | Plan on Electrolier Lighting Systems on Avalon Blvd |
| B-4704 | Secondary Sewer Renewal Program Fries Ave and Pier A St |
| D-1151 | Plan and Profile of Sewer in Broad Avenue |
| D-1153 | Storm Drain in Broad Ave |
| D-3452 | Plan and Profile of Sewer in Fries Avenue |
| D-19938 | East Wilmington Interceptor Sewer and Pumping Plant |
| D-24371 | Marine Ave and Opp Street Relief Sewer |
| D-32304 | Storm Drain Harry Bridges Blvd |
| D-131212/1-584 | Truck Lines Law to Lat Strip Map |
| E-1591 | Emergency Rehabilitation for Sewers – Fries Ave |
| E1304-D | Cole Lighting – Decorative Post Light – Type II |
| F2-CA100 | Fuel Oil Pipeline Harbor Sp to Olympic Tank Farm |
| F2-CA102 | Fuel Oil Pipeline Harbor SP to Olympic Tank Farm |
| G-8182/51-69811 | 138kV Conduit Line A St Steam Plant to Island Ave |
| P-4784 | Street Plan and Profile of Fries Ave |
| P-37166 | Harry Bridges Blvd Voluntary Improvements |
| PPC-140 | Petroleum Pipeline PPC-140 Alignment Sheet |
| S27-205D | LABOE Substructure Record Map |
| S27-205NE | LABOE Substructure Record Map |
| S27-209NW | LABOE Substructure Record Map |
| S27-209-SW | LABOE Substructure Record Map |
| SL-861 | B St & Avalon Blvd |
| SL-1013 | Avalon Blvd & “B” St |
| SL-1913 | Avalon Blvd & B St |
| SL-2659 | B St & Broad Ave |
| SL-7317 | Water St to G St |
| WD-100-1800-PL | C-941-12” Pipeline to/from Marine Terminal |
| WD-100-1811D-PL | Refinery to/from Marine Terminal |
| Y-4783 | Mormon Island Lines |

END OF SECTION

## 01 ABBREVIATIONS AND DEFINITIONS

### a ABBREVIATIONS:

AASHTO: American Association of State Highway and Transportation Officials

ACI: American Concrete Institute

ANSI: American National Standards Institute

AREMA: American Railroad Engineering and Maintenance of Way Association

ASTM: American Society for Testing and Materials

AWPA: American Wood Protection Association

AWPB: American Wood Preservers Bureau

AWS: American Welding Society

AWWA: American Water Works Association

CRSI: Concrete Reinforcing Steel Institute

DBE: Disadvantaged Business Enterprise

DWP: Department of Water and Power

ICEA: Insulated Cable Engineers Association

IES: Illumination Engineering Society

IEEE: Institute of Electrical and Electronics Engineers

LAHD: Los Angeles Harbor Department

LBE: Local Business Enterprise

MBE: Minority Business Enterprise

NEC: National Electrical Code

NEMA: National Electrical Manufacturers Association

NFPA: National Fire Protection Association

01000.01 Cont'd.

| | |
|---|---|
| OBE: | Other Business Enterprise |
| OSHA: | Occupational, Safety, and Health Administration |
| POLA: | Port of Los Angeles |
| PVC: | Polyvinyl chloride |
| RS: | Reference Specifications |
| SBE | Small Business Enterprise |
| SSPC: | Society for Protective Coatings |
| UDBE: | Underutilized Disadvantaged Business Enterprise |
| UL: | Underwriters Laboratories, Inc. |
| VSBE: | Very Small Business Enterprise |
| WBE: | Women Business Enterprise |

b DEFINITIONS:

Applicable Laws: Any and all federal, state, county, or governmental agency laws, statues, ordinances, standards, codes, rules, ordinances, resolutions, orders, or requirements adopted or implemented under color of law, in effect at any point during the term of Contract, pertaining to: Project, performance of Work by Contractor and/or those operating for or on behalf of Contractor, operation and occurrences on Project Site; use, occupancy, and/or condition of Laydown Area(s) and Contract Documents.

Award: The acceptance, by City, of the successful Bidder's proposal.

Backland: The area of a marine terminal’s property behind the wharf where cargo, containers, chassis, and other equipment are stored and other non-water invasive equipment and facilities are located.

Bidder: The person, firm, or corporation submitting a bid for Work.

Board: Board of Harbor Commissioners; the body vested with the control and management of Harbor Department of City of Los Angeles, as created by and operating under City Charter.

01000.01 Cont'd.

Business Day: Monday, Tuesday, Wednesday, Thursday, and Friday during working hours (8 am to 5 pm with a non-paid 1-hour break), with the exception of City of Los Angeles holidays.

Calendar Day: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday. The term day(s) whether used on Drawings or Specifications are consecutive Calendar Days unless otherwise specified.

Changes in Work: A written order from City to Contractor covering changes in Drawings, Specifications, or Bid Proposal Line Items quantities and establishing the basis of payment and Contract Time adjustments, if any, for Work affected by such changes. Change Orders (COs) as defined in Cost-Plus Change Work Order (Change Orders) Subsection of this Section, and Authorities for Adjustment (AFAs) as defined in Authority for Adjustments Subsection of this Section, is considered to be Changes in Work.

City: City of Los Angeles, California.

Consultant: A firm under contract or agreement with Department to perform services.

Contamination: A spill, discharge, or release of any Environmentally Regulated Material.

Contract Documents: "Contract Documents" shall consist of Notice Inviting Bids, Information for Bidders, Bidding Documents, Contract, Performance Bond, Payment Bond, Affidavits of Completion, Contractor/Subcontractor/Supplier Information, and Contract Documents Sections of this Specification No. 2804A together with Contractor supplied documents required by these sections, and Specifications, Drawings, standard plans, and reference specifications referenced in Specifications or on Drawings, the appendices, addenda, permits, and Changes in Work.

Contract: The written agreement executed by Contractor and City covering Work not to exceed three (3) years commencing on Effective Date.

Contractor: The individual, firm, or corporation with whom Contract is made, or its legal representative.

Contract Time: The number of Calendar Days, stated in Contract Time Article of CONTRACT Section, allowed for completion of Work including any maintenance or plant establishment period and authorized time extensions. The first Notice to Proceed (NTP) shall specify the date on which Contract Time begins.

days: See definition for Calendar Day.

01000.01 Cont'd.

Department: Harbor Department of City of Los Angeles.

Drawings: The official drawings or exact reproductions approved by Engineer, which show Project Site and any Laydown Area(s), character, dimensions, and details of Work.

Effective Date: The date of execution of Contract by Executive Director upon authorization of Board, subject to the provisions of Charter Section 245 of City of Los Angeles.

Engineer: Chief Harbor Engineer of Construction Division of Department or designated representative.

Environmentally Regulated Material: Any material, pollutant, hazardous or toxic substance, material, or waste at any concentration, that is or becomes regulated by the United States, the State of California, or any local or governmental authority having jurisdiction over Project Site and any Laydown Area(s) and/or Contractor's undertaking of Work. Environmentally Regulated Materials shall mean: (i) "hazardous substance" as defined by Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); (ii) "hazardous waste" as defined in Resource Conservation and Recovery Act (RCRA); (iii) Any pollutant, contaminant, or hazardous, dangerous, or toxic chemical, material, or substance, within the meaning of any other applicable federal, state, or local law, regulation, ordinance, or requirement (including consent decrees and administrative orders imposing liability or standard of conduct concerning any hazardous, dangerous, or toxic waste, substance, or material, now or hereinafter in effect); (iv) Radioactive material, including any source, special nuclear, or byproduct material as defined in the Atomic Energy Act of 1954 (42 USCS §§ 2011 et seq.) in its present or successor form; (v) Asbestos in any form or condition; (vi) Polychlorinated biphenyls ("PCBs") and any substance or compound containing PCBs; and (vii) Petroleum products.

Executive Director: Executive Director of Department or designated representative.

Inspector: An authorized representative of Engineer assigned to make all necessary inspections and tests of Work performed and being performed, and of the materials furnished and being furnished by Contractor.

Landside: Project activity approach from land, for example, pile driving from landside.

01000.01 Cont'd.

Laydown Area(s): Specific area or real property, ground, pavement, or water access expressly identified either on Drawings if applicable or in writing by Executive Director, located near or at Project Site, designated for the following uses and no others: delivery, storage, and handling of the materials and equipment to be installed or constructed as part of Work, field offices, parking, and access.

Notice of Award: The letter informing Contractor that Award of Contract has been made. The date on the Notice of Award starts the 30-day period for execution of Contract and the 14-day period for submittal and approval of acceptable bonds and insurance.

Notice(s) to Proceed: The letter(s) from Engineer which notify(ies) Contractor of the effective date Contract Time shall begin, and authorizes Work or items of Work to be started.

Project: The structure or improvement to be constructed in whole or in part, through the performance of Contract.

Project Site: The entire area of real property on which Work is to be performed. Area or areas where Project materials and equipment, as described in NOTICE INVITING BIDS Section and SUMMARY OF WORK Section of Specifications are installed or constructed.

Proposal: The written offer of Bidder (when submitted on the approved proposal form) to furnish the necessary materials, and perform Work in accordance with Contract Documents.

Specifications: The portion of Contract Documents containing written technical descriptions, instructions, provisions, general conditions, supplementary conditions, and detailed requirements pertaining to materials, methods, and manner of performing Work and to the quality of Work to be furnished and installed under Contract. Standards for specifying materials and testing which are cited in Specifications by reference shall have the same force and effect as if included in Contract Documents.

Substantial Completion: Upon satisfactory completion of Work, Engineer shall issue a Substantial Completion letter to Contractor to indicate a stop in Contract Time and that Work is acceptable for its intended use. Such Substantial Completion letter may include a list of punch list items that must be completed by Contractor prior to final acceptance of Work by Department.

Superintendent: Contractor's executive representative who is present on Project Site and any Laydown Area(s) during construction, authorized to receive and fulfill instructions from Engineer, and who shall supervise and direct the construction.

01000.01 Cont'd.

Waterside: Project activity approach from water, for example, pile driving from waterside.

Work: The furnishing of labor, materials, tools, equipment, and incidentals necessary and convenient to Contractor's performance of all duties and obligations imposed by Contract. Unless otherwise noted, Work shall be performed on Project Site and any Laydown Area(s).

02 TIME FOR SUBMITTAL OF BONDS

a Within 14 Calendar Days after Notice of Award Contractor shall furnish City a performance bond and a payment bond.

03 PERFORMANCE BOND

a A satisfactory performance bond in a form approved by the City Attorney shall be furnished as a guarantee of the faithful performance of Contract in the sum of 100 percent of the total amount of Contract.

b The form of bond is included in Section 00070.

c No payment shall be made to Contractor until Contractor's performance bond has been approved by the City Attorney.

04 PAYMENT BOND

a If bid exceeds $25,000, a satisfactory payment bond in a form approved by the City Attorney shall be furnished in the sum of 100 percent of the total amount of Contract to secure payment of all claims, demands, liens or charges of the State of California, of material suppliers, mechanics, or laborers employed by Contractor or by any subcontractor.

b The form of bond is included in Section 00074.

c No payment shall be made to Contractor until Contractor's payment bond has been approved by the City Attorney.

05 RESPONSIBILITY FOR LOSS

a During use and occupancy of Project Site and any Laydown Area(s) and progress of Work under Contract and until its final acceptance, Contractor shall have the charge and care thereof and shall take every necessary precaution against injury or damage to any part thereof by the action of the elements, or from any other cause whatsoever whether arising from the execution or from the non-execution of Work.

01000.05 Cont'd.

b Contractor shall, at Contractor's sole cost and expense, except as provided in Paragraph c of this Subsection, rebuild, repair, restore and make good all injuries or damages to any portion of Work from any and all causes before its completion and final acceptance, and shall deliver Work complete in accordance with the terms of Contract.

c Contractor shall not be required to pay more than 5% of the contracted amount to rebuild, repair, restore, and make good all injuries or damages to any portion of Work, built in accordance with accepted and applicable building standards, Drawings, and Specifications, that has been damaged by an earthquake in excess of a magnitude of 3.5 on the Richter scale or tidal wave.

06 PREVAILING WAGES

a Contractor shall pay the general prevailing rate of per diem wages and rates for legal holiday and overtime work currently being paid in the area where Work is being performed.

b Pursuant to the provisions of the Labor Code of the State of California, the general prevailing rate of wages for each craft, classification or type of workers needed in the execution of contracts under the jurisdiction of Board, shall be those rates as determined by the Director of the Department of Industrial Relations of the State of California. Copies of the applicable Determinations by the said Director are on file in Construction Division and are hereby incorporated and made a part hereof the same as though fully set forth herein. Copies of the applicable Determinations may be obtained at or by request to Department.

c When Contractor has been determined to be in violation of Section 377 of City Charter making applicable the provisions of the California Labor Code relating to the payment of not less than the prevailing per diem wages on public works, deductions may be made from moneys due or to become due Contractor in the amount of twice the difference between such stipulated prevailing rates, and the amount paid to each wage worker for each Calendar Day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate.

d Contractor shall also comply with Section 1775 of the Labor Code providing for a penalty per day as determined by the Labor Commissioner for each Calendar Day, or part thereof, for which each worker was paid less than the prevailing wage.

01000.06 Cont'd.

e Contractor and subcontractors shall keep an accurate record showing the names and occupations of all workers employed by them in connection with any Work done under Contract, and the per diem wages paid to each of such workers, and shall keep such record open at all reasonable hours to the inspection of Board and to the State Division of Labor Law Enforcement. Contractor in all other respects shall comply with Section 1776 of the Labor Code.

f No later than the end of the work day following the day on which Work was performed by Contractor, or any subcontractor, Contractor and applicable subcontractor(s) shall complete and furnish Contractor Daily Field Report, included as Subsection 67 of this Section, to Inspector. When Work has been performed, Contractor shall submit a form regarding all employees and equipment at Project Site and any Laydown Area(s) on the work day, and Contractor shall submit a separate form for each subcontractor regarding each subcontractor's employees and equipment at Project Site and any Laydown Area(s) on the work day. Each field report shall:

1 Identify Project title, Specification number, name of Contractor or subcontractor, and date on which Work was performed.

2 Show the names of the workers and identify their applicable company affiliation (Prime Contractor, subcontractor, supplier, or vendor).

3 Show the labor classification for each worker. If worker is an operating engineer or teamster, Contractor or subcontractor must indicate which piece of equipment was operated by the worker.

4 Show the Start Time and End Time for the worker listed, as well as the total hours worked by the worker on the work day.

5 Show the type of equipment, size, identification number, and hours of operation, including loading and transportation, if applicable, utilized on the work day.

6 Contain the printed name and title for Contractor or subcontractor representative, and shall be dated and signed by same.

g Contractor shall submit the original (wet signature by Contractor or subcontractor) to Inspector for review. If additional space is needed, a second form, with pages numbered accordingly, can be completed.

01000.06 Cont'd.

h Inspector shall compare Inspector's records with the report submitted by Contractor, discuss any apparent discrepancies with Contractor, and reconcile the report (and have it re-submitted, if necessary). Once the report is agreed upon by Contractor and Inspector, Inspector prints his/her name on the report and dates and signs the report. Each party shall retain a copy of the report, signed by both parties.

i Certified payrolls from Contractor and all subcontractors shall be submitted to City weekly through the Department of Public Works Bureau of Contract Administration's Online Certified Payroll System (OCPS) and shall be accompanied by a Statement of Compliance, signed electronically on OCPS by Contractor or Contractor's agent attesting that the payrolls are correct and complete and the wage rates contained therein are not less than those set by the applicable wage determinations incorporated into Contract. City reserves the right to reject incomplete payroll reports and request re-submittal of complete reports.

07 WAGE AND EARNING ASSIGNMENT ORDERS/NOTICES OF ASSIGNMENTS

a Contractor and its subcontractors shall comply with all applicable state and federal employment reporting requirements for Contractor's and/or subcontractor's employees.

b Contractor and/or subcontractor shall certify that the principal owner(s) are in compliance with any Wage and Earnings Assignment Orders and Notices of Assignment applicable to them personally. Contractor or subcontractor shall comply with all lawfully served Wage and Earnings Assignment Orders and Notices of Assignments in accordance with California Family Code §§5230 et. seq. Contractor or subcontractor shall maintain such compliance throughout the term of Contract.

08 WORKING HOURS

a Work shall be accomplished during daylight hours. Night work shall only be allowed, if in the opinion of Engineer, Work does not:

1 conflict with noise laws, ordinances, regulations, City code, or
2 create unsafe working conditions or poor quality control provisions.

b Requests for night work shall be made 48 hours prior to the desired start of the night work.

09 APPRENTICE UTILIZATION ON PUBLIC WORKS

a Contractor shall comply with the Provisions of Labor Code, State of California, Section 1777.5 relating to apprentice employment and training. Contractor shall assume full responsibility for compliance with said Section with respect to all apprenticeable occupations upon Project.

b Section 1777.5 does not apply to prime contracts involving less than $30,000.

10 NON-DISCRIMINATION PROVISIONS

a Contractor shall agree to City of Los Angeles Non-discrimination provisions as provided in Subsections 00030.03 and 00030.04 of BIDDING DOCUMENTS Section.

11 BOARD RIGHT TO TERMINATE CONTRACT

a Board may terminate Contract at its own discretion without liability to Contractor for damages when conditions encountered during Work make it impossible or impracticable to proceed, or when City is prevented from proceeding with Contract by act of God, by law, or by official action of a public authority.

b Upon termination, Contractor may receive payment on the basis shown below in consideration of its irrevocable written agreement to release any and all claims and/or causes of action against City arising out of or related to such termination and to indemnify and hold City harmless from any and all liability, claims and/or causes of action arising from or related to such termination. City shall prepare such written agreement.

1 Termination occurs prior to the Notice to Proceed date
Subject to Contractor's full satisfaction of the requirements of Paragraph b of this Subsection, Contractor shall be entitled to payment as shown below.

| Value of Contract | Payment Due to Contractor |
|---|---|
| $0 to $1,000,000 | 10% of Contract amount |
| $1,000,001 to $5,000,000 | $100,000 plus 5% of Contract amount above $1,000,000 |
| $5,000,001 to $10,000,000 | $300,000 plus 2.5% of Contract amount above $5,000,000 |
| $10,000,001 to $50,000,000 | $425,000 plus 1% of Contract amount above $10,000,000 |
| $50,000,001 to $100,000,000 | $825,000 plus 0.5% of Contract amount above $50,000,000 |
| Above $100,000,000 | $1,075,000 regardless of Contract amount |

01000.11 Cont'd.

2 Termination occurs after Notice to Proceed date
Subject to Contractor's full satisfaction of the requirements of Paragraph b of this Subsection, Contractor shall be entitled to the estimates and payment for all Work done to the date of termination, if any, plus a percentage of the value of Work remaining (determined by subtracting payments made, or due, from Contract price), as shown below.

| Value of Work Remaining | Payment Due to Contractor |
|---|---|
| $0 to $1,000,000 | 10% of value of Work remaining |
| $1,000,001 to $5,000,000 | $100,000 plus 5% of value of Work remaining above $1,000,000 |
| $5,000,001 to $10,000,000 | $300,000 plus 2.5% of value of Work remaining above $5,000,000 |
| $10,000,001 to $50,000,000 | $425,000 plus 1% of value of Work remaining above $10,000,000 |
| $50,000,001 to 100,000,000 | $825,000 plus 0.5% of value of Work remaining above $50,000,000 |
| Above $100,000,000 | $1,075,000 regardless of value of Work remaining |

12 ASSIGNMENTS

a Contractor shall not assign, transfer, convey, sublet, or otherwise dispose of Contract, or rights, title or interest in or to the same or any part thereof, without the previous consent in writing of Executive Director endorsed upon or attached to the copies of Contract filed in Office of Board of Harbor Commissioners.

b Nothing herein contained shall be construed to hinder, prevent or affect an assignment by Contractor for the benefit of Contractor's creditors; and no right under Contract shall be asserted against City, in law or in equity, by reason of any so-called assignment of Contract, or any part thereof, unless authorized as aforesaid by the written consent of Executive Director.

c Any assignment of money shall be subject to all proper setoffs and withholdings in favor of City and to all deductions provided for in Contract. All money withheld whether assigned or not, shall be subject to being used by City for completion of Work, should Contractor be in default.

## 13 CANCELLATION FOR DEFAULT

a If Contractor fails to begin Work within the time stipulated, or if Work to be done under Contract is abandoned by Contractor, or if Contract is assigned or Work sublet by Contractor otherwise than as herein specified, or if at any time Engineer shall be of the opinion, and shall so certify in writing to Executive Director, that the performance of Contract is unnecessarily or unreasonably delayed, or that Contractor is willfully violating any of the conditions or covenants of Contract or is executing the same in bad faith, or not in accordance with the terms thereof, Executive Director may notify Contractor not to resume, or to discontinue, all Work, or any part thereof, under Contract, by a written notice served upon Contractor.

b Executive Director shall advise the bondsperson(s) or surety(ies) guaranteeing faithful performance of Contract, of the suspension and reasons therefor, and shall notify said bondsperson(s) or surety(ies) that they shall be given fourteen days within which to arrange for the completion of Work in accordance with the terms and provisions of Contract by another contractor or firm of contractors, satisfactory to Executive Director. If such bondsperson(s) or surety(ies) requests additional time in which to arrange for completion of Work, Executive Director may, in its sole and absolute discretion, extend such time period; however, Executive Director is under no obligation to do so.

c Should the bondsperson(s) or surety(ies) fail to effect satisfactory arrangements within the period hereinbefore stipulated, Executive Director shall thereupon have the right without further notice, to exclude Contractor, bondsperson(s) or surety(ies) and any subcontractor or employee upon the line of work from Project Site and any Laydown Area(s) and take possession of all material and equipment, and complete Work by City forces or by letting the unfinished Work to another contractor, or by a combination of such methods.

01000.13 Cont'd.

d The cost of completing Work shall be charged against Contractor and the surety or bondspersons to the extent of their liability. If Department is required to complete Work or satisfy other Contract obligations because of the surety or bondspersons' failure to comply with the bond obligations, then bondspersons or surety shall, nevertheless, immediately reimburse City all costs in excess of Contract amount which City is obligated to pay in order to complete the Work. If surety or bondspersons fail to pay such amount immediately upon City's demand, then City shall be entitled to collect interest from bondspersons or sureties on the amounts City is required to pay excess of Contract amount. The interest rate which surety or bondspersons shall pay shall be 2% in excess of the interest rate charged by Bank of America from time to time for prime commercial loans of ninety (90) day maturities. The interest rate shall accrue on all amounts City has had to pay excess of Contract amount from the date of City's payment. Engineer's certificate as to the amount of Work done, the cost, and the excess cost, if any, of completing Work specified by Contract shall be conclusive and binding upon Contractor's assignees and sureties.

e If the surety or bondspersons assumes any part of Work, it shall take Contractor's place in all respects for that part, and shall be paid by City for all work performed by it in accordance with Contract. If the surety or bondspersons assumes the entire Contract, all money due Contractor at the time of Contractor's default shall be payable to the surety as Work progresses, subject to the terms of Contract.

f In lieu of the provisions of this Subsection for setting aside Contract and completing Work for proper cause, City may pay Contractor for the parts already done according to the provisions of Contract and Specifications and may treat the parts remaining undone as if they had never been included or contemplated by Contract. No claim under this provision shall be allowed Contractor for prospective profits on work uncompleted by the Contractor.

g The provisions of this Subsection shall be in addition to all other rights and remedies available to City under law.

14 OTHER CONTRACTS

a City reserves the right to have Work done in or about Project Site and any Laydown Area(s) as provided for in Contract, by persons, firms, or corporations other than the said Contractor, or to perform the same by force account under the direction and supervision of Engineer.

b Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their Work, and shall properly connect and coordinate Work with others.

01000.14 Cont'd.

c If any part of Contractor's Work depends upon the work of any other contractor for proper execution or results, Contractor shall inspect and promptly report to Engineer any defects in such work that render it unsuitable for such proper execution and results. Failure to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper.

15 CONTRACT DOCUMENTS COMPLEMENTARY

a Contract Documents are intended to be complementary and to describe and provide for a complete Project. Anything in Specifications and not on Drawings; or on Drawings and not in Specifications, shall be considered as though shown or mentioned in both.

b Information included by specific reference in any of Contract Documents shall be a part of Contract Documents as though reproduced in entirety in the document where the reference occurs.

c While it is believed that much of the information pertaining to conditions which may affect the cost of Work shall be shown on Drawings or indicated in Specifications, City does not warrant the completeness or accuracy of such information. It is Contractor's responsibility to ascertain the existence of any conditions affecting the cost of Work which would have been disclosed by reasonable examination of Project Site and any Laydown Area(s) and Contract Documents.

d All contact information, website addresses, and related references are provided for convenience only, but it is Contractor's responsibility to obtain the current applicable phone numbers, addresses, and websites in the event that those provided are no longer current.

16 PRECEDENCE OF DOCUMENTS

a If there is a conflict between Contract Documents, the document listed herein as higher in precedence shall control.

b The precedence shall be as follows (ranking 1 as highest):
1 Permits and Permit Documents
2 Specifications (in total) including but not limited to the following:
a. 2022 State of California Department of Transportation (Caltrans) Standard Plans and Standard Specifications available at: https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications.
3 Drawings
4 Standard Plans

01000.16 Cont'd.

5 Standard Specifications
   a. For Drawing No. 1-3302A, precedence of references shall be as follows (ranking 1 as highest):
      1. ACI 117-10
      2. AASHTO Guide Specifications for Highway Construction
      3. Caltrans Falsework Manual
      4. Post-Tensioning Institute (PTI) Recommendations for Stay Cable Design, Testing, and Installation
6 Reference Specifications

c Authorizations for Adjustments, Cost-plus Change Orders, supplemental agreements, and approved revisions to Drawings and Specifications shall take precedence over documents listed.

d Detailed and large-scale Drawings shall have precedence over general and small-scale Drawings. Drawings shall have precedence over shop drawings.

e Reference drawings are included for information only. Such information is given as being the best factual information available without the assumption of responsibility for its accuracy or for any conclusions that Contractor might draw therefrom.

17 STANDARD SPECIFICATIONS

a Standard Specifications, such as ASTM, ACI, and ANSI, referenced herein shall be of the edition and supplements current as of the date of advertising for bids unless otherwise specified herein.

18 REFERENCE SPECIFICATIONS

a Whenever the words "Reference Specifications" (sometimes abbreviated RS) are used, either in Specifications, or on Drawings, it shall mean "GREEN BOOK - STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION," edition and supplements current as of the date of advertising for bids unless otherwise specified herein.

19 ELECTRONIC COPIES OF CONTRACT DOCUMENTS FURNISHED

a Engineer shall furnish to Contractor, free of charge, electronic files in pdf format of Contract Documents reasonably necessary for the execution of Work.

b These Contract Documents are the property of Department, and shall not be reused on other work.

## 20 RESPONSIBILITY OF COSTS AND MATERIALS

a Unless otherwise specifically stipulated elsewhere in Contract Documents, Contractor shall provide at its sole cost and expense for all materials, labor, water, tools, equipment, light, power, transportation, and other facilities, utilities, and incidentals necessary for the execution and completion of Work.

b Unless otherwise specifically stipulated elsewhere in Contract Documents, all materials, parts, and equipment incorporated in permanent Work shall be new and free from defects.

## 21 SHOP DRAWINGS AND MATERIALS SAMPLES

a Shop drawings shall consist of drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data prepared by Contractor or any subcontractor, manufacturer, supplier or distributor, to illustrate some portion of Work not covered in necessary detail by Drawings furnished by Department.

b Samples shall consist of physical examples required by Contract to be furnished by Contractor to illustrate materials, labor, and equipment to conform to Specifications, and to establish standards by which completed Work shall be judged for acceptability. These samples are distinguished from test samples obtained for laboratory analysis and destructive testing.

c Contractor shall review and stamp with approval and submit with reasonable promptness and in orderly sequence so as to cause no delay in Work or in the work of any other contractor, all shop drawings and samples required by Contract Documents and subsequently by the course of construction.

d By approving and submitting shop drawings and samples, Contractor thereby represents that it has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or shall do so, and that each shop drawings and samples has been checked and coordinated with the requirements of Work and of Contract Documents.

e Engineer shall review and approve shop drawings and samples only for conformance with the design concept of Project and with the information given in Contract Documents. Review time shall be 28 Calendar Days, unless otherwise stated in Specifications. The time for City to review items does not commence until Contractor's submittal (or re-submittal, addressing Engineer’s corrections/comments resulting from Engineer’s review of previous submittal) is complete. Engineer's approval of a separate item shall not indicate approval of an assembly in which the item functions. One copy of all submittals shall be returned to Contractor.

01000.21 Cont'd.

f At the time of submission, Contractor shall inform Engineer, in writing, of any deviation in the shop drawings and samples from the requirements of Contract Documents.

g Contractor shall make any corrections required by Engineer and shall resubmit the required number of corrected copies of shop drawings and samples until approved. Contractor shall direct specific attention in writing to revisions on resubmitted shop drawings other than the corrections requested by Engineer on previous submissions.

h Engineer's approval of shop drawings and samples shall not relieve Contractor of responsibility for any deviation from the requirements of Drawings and Specifications found in the shop drawings and samples unless Contractor has informed Engineer in writing of such deviation at the time of submission and Engineer has given written approval of the specific deviation in letter form separately from any notations on the shop drawings. Engineer's approval shall not relieve Contractor of any responsibility for errors or omissions in the shop drawings and samples.

i No portion of Work requiring shop drawing and sample submission shall commence until the submission has been approved by Engineer. All such portions of Work shall be in accordance with approved shop drawings and samples.

j The cost of furnishing shop drawings and samples shall be considered as included in the prices bid for Work and no addition to Contract price shall be made therefor.

22 SOURCE INSPECTIONS AND SAMPLES FOR TESTING

a Unless otherwise specified, inspection is required at the source for asphalt concrete paving mixtures, structural concrete, metal fabrication, metal casting, welding, concrete pipe manufacture, concrete piles, steel piles, steel pipes, sheet steel piling, protective coating application, and similar shop or plant operations. Steel pipe in sizes less than 18 inches in diameter and vitrified clay and cast iron pipe in all sizes are acceptable upon certification as to compliance with Specifications, subject to sampling and testing by Engineer. Standard items of equipment such as electrical motors, conveyors, elevators, plumbing fixtures, and other similar equipment, are subject to inspection at Project Site and any Laydown Area(s). Special items of equipment such as designed electrical panel boards, large pumps, gangways, floating docks, marine fenders, and other similar equipment, are subject to inspection at the source.

01000.22 Cont'd.

b Before incorporation in Work, Contractor shall submit samples of materials required by Contract Documents. Contractor shall deliver the materials for testing to the place and at the time designated by Engineer.

c Contractor shall notify Engineer in writing at least 15 days in advance, of Contractor's intention to use materials for which tests may be necessary, to allow sufficient time to perform the tests. The notice shall name the proposed supplier and source of the materials.

d Unless otherwise specified, all testing and inspection within 75 miles of Department Administration Building shall be performed by Engineer, at no expense to Contractor.

e Unless otherwise specified, when Contractor intends to purchase materials, fabricate products, or equipment from sources located more than 75 miles from Department Administration Building, an independent inspector or accredited testing laboratory (approved by Engineer), shall be provided by Contractor at Contractor's sole cost and expense, to inspect and test the materials, equipment, or process. Approval of the independent inspector or accredited testing laboratory shall be obtained before producing any material or equipment. The independent inspector or accredited testing laboratory shall evaluate the materials for conformance with the requirements of Drawings and Specifications. The independent inspector or accredited laboratory shall forward evaluation and test reports to Engineer, with copies provided to Contractor. No materials or equipment shall be shipped nor shall any processing, fabricating, or treating of materials be done without proper inspection by the independent inspector or accredited testing laboratory. Approval by the independent inspector or accredited testing laboratory shall not relieve Contractor of responsibility for complying with the requirements of Contract Documents.

f Testing of the materials furnished by Contractor shall be made by Engineer in accordance with commonly recognized standards or national organization and such special methods and tests as are in use by Engineer in accordance with provisions of Specifications. If materials should fail any tests, retesting shall be performed by Engineer and paid for by Contractor.

g Engineer may waive the materials testing and inspection requirements of Specifications and accept the manufacturer's written certificate of compliance that the materials to be supplied meet the requirements. Materials test data may be required by Engineer to be included with the submittal.

## 23 DEFECTIVE MATERIALS AND CONSTRUCTION

a Materials and labor not conforming to the requirements of Specifications shall be considered defective and shall be subject to rejection. Defective Work or materials, whether in place or not, shall be removed immediately from Project Site and any Laydown Area(s) by Contractor, when so directed by Engineer.

b Contractor shall be required, at Contractor's sole cost and expense, to replace any inferior material, or correct any imperfect Work whenever discovered, as ordered by Engineer.

c If Contractor fails to replace any defective or damaged Work or material after reasonable notice, Engineer may withhold payments until the defective or damaged Work or material is replaced.

d No material furnished or Work to be done is to be considered as accepted which may be defective or deficient in any of the requirements of Specifications, whether or not due to any negligence of Inspector, or other authorized person, to point out such defect or deficiency during the execution of Contract.

## 24 PROTECTION OF MATERIALS

a Contractor shall provide and maintain storage facilities and employ such measures as shall preserve the specified quality and fitness of materials to be used in Work. Stored materials shall be reasonably accessible for inspection. Contractor shall also adequately protect new, existing Work and all items of equipment until completion of Contract and acceptance by Executive Director.

b Contractor shall be held responsible for all materials furnished by City after such are delivered at Project Site and any Laydown Area(s) and deductions shall be made from any money due or to become due Contractor to make good any shortages and deficiencies from any cause whatsoever which may result after such delivery, or for any demurrage charges due to delinquency in unloading. In case of suspension of Work from any cause whatever, Contractor shall be responsible for all materials whether furnished by Contractor or by City, and shall properly store such if necessary.

## 25 AUTHORITY OF ENGINEER

a Board has the final authority in all matters affecting Work covered by Contract Documents. Within the scope of Contract, Engineer shall have the authority to enforce compliance with Contract Documents. Contractor shall promptly comply with instructions from Engineer and Engineer shall have the executive authority to enforce and make effective such decisions and orders.

b On all questions relating to quantities, the acceptability of material, equipment, or Work, the execution, progress or sequence of Work and the interpretation of Contract Documents, the decision of Engineer is final and binding, and shall be precedent to any payment under Contract, unless otherwise ordered by Board.

## 26 SUBSURFACE DATA AND PHYSICAL CONDITIONS

a Engineer shall make available all information in Department's possession on subsoil conditions in the vicinity of Work. Any additional subsurface exploration shall be done by Contractor at Contractor's sole cost and expense.

b All soil test hole data, water table elevations, and soil analyses apply only at the location of the test holes and to the depths indicated. The indicated elevation of the water table is that existing at the date the test hole data was determined. A difference in elevation between groundwater shown and groundwater actually encountered during construction shall not be considered as a basis for extra compensation.

01000.26 Cont'd.

c Contractor shall promptly, and before such conditions are disturbed, notify Engineer in writing of: 1) Subsurface or physical conditions at Project Site and any Laydown Area(s) differing materially from those indicated in Contract Documents or as given by survey points and instructions, 2) Unknown physical conditions at Project Site and any Laydown Area(s), of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in Contract, or 3) Material that Contractor has suspected to possibly be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class 1, Class II, or Class III disposal site in accordance with provisions of existing law. Engineer shall promptly investigate the conditions, and if Engineer finds that such conditions do so materially differ, or do involve hazardous waste and cause an increase or decrease in the cost of, or the time required for, performance of Contract, an equitable adjustment shall be made in accordance with applicable Contract provisions. Any request by Contractor for adjustment hereunder shall not be allowed unless written notice as herein required has been given. In the event that a dispute arises between City and Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in Contractor's cost of, or time required for, performance of any part of Work, Contractor shall not be excused from any scheduled completion date provided for by Contract but shall proceed with all Work to be performed under Contract. Contractor shall retain any and all rights provided either by Contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

27 PROTECTION OF EXISTING UTILITIES

a Contractor is responsible for the protection of utilities and pipelines shown on Drawings, or otherwise made known to Contractor, which are designated to be protected or to remain in service. If service is interrupted, or utilities damaged by Contractor's operations, Contractor shall restore service and repair the utility to the satisfaction of the owner at Contractor's sole cost and expense.

## 28 HARBOR DATUM

a All depths and elevations given in Specifications or shown on Drawings are referenced to the plane of the National Geodetic Vertical Datum of 1929 (NGVD 29), Mean Lower Low Water (MLLW) which is assumed as elevation 0.00.

b The approximate range of tides, based on this datum is as follows:

| | |
|---|---|
| Lowest Tide | -2.5 feet |
| Mean Lower Low Water | 0.0 feet |
| Mean Sea Level | +2.8 feet |
| Mean Higher High Tide | +5.4 feet |
| Highest Tide | +7.5 feet |

## 29 SURVEYING AND STAKING

a Unless otherwise specified, Engineer shall provide and be responsible for surveying needed to construct Project. Contractor shall be responsible for preserving construction survey stakes and marks for the duration of their usefulness. If any construction survey stakes are lost or disturbed and need to be replaced, such replacement shall be by Engineer at the sole cost and expense of Contractor.

b Contractor shall notify Engineer at least two working days before survey services shall be required in connection with the laying out of any portion of Work. Contractor shall dig all holes necessary for line and grade stakes.

c Unless otherwise specified, stakes shall be set and stationed by Engineer for curbs, headers, sewers, storm drains, rough grade, and a corresponding cut or fill to finished grade (or flow line) indicated on a grade sheet.

d Grades for underground piping and conduit shall be set at the surface of the ground. Contractor shall transfer them to the bottom of the trench.

e For all buildings and structures, including wharves, Engineer shall furnish land surveys, base lines, and stakes for locating the principal component parts of Work together with a suitable number of bench marks. Contractor shall develop and make all detail surveys, lines, and elevations as necessary.

f Contractor shall check all the dimensions as a whole and in detail, and shall layout and become responsible for the exact position and elevation of all part of the structures.

30 INSPECTION OF WORK

a All Work done and all material furnished shall be subject to the inspection and approval of Engineer, and Contractor shall perform Work only in the presence of Engineer.

b Work done without proper inspection shall be subject to rejection. Engineer shall at all times have access to Work during its preparation and construction. Contractor shall furnish to Engineer equipment and facilities required for inspection of Work in accordance with the requirements and intentions of Contract Documents.

c The inspection of Work shall not relieve Contractor of any obligation to fulfill all conditions of Contract as prescribed.

d If any Work should be covered up without approval or consent of Engineer, it must, if required by Engineer, be uncovered for examination and properly restored at Contractor's sole cost and expense.

e Re-examination of any Work may be ordered by Engineer, and, if so ordered, Work must be uncovered by Contractor. If such Work is found to be in accordance with Contract Documents, City shall pay the cost of the re-examination and replacement Work. If such Work is not in accordance with Contract Documents, Contractor shall pay such costs.

31 FIELD OFFICE TRAILER AND FIELD PERSONNEL

a Contractor shall be responsible for providing, maintaining, and paying all costs associated with administering and managing Contract, including field and home office personnel, materials, equipment, tools, construction trailers, and any other items necessary until the end of Contract Time including maintenance or plant establishment period.

b Contractor shall provide at all times during construction a competent Superintendent and necessary assistants satisfactory to Engineer. Superintendent shall represent Contractor and all direction given to Superintendent shall be binding as if given to Contractor.

c Contractor’s Superintendent shall be assigned solely to Project and be present on Project Site and any Laydown Area(s) for the entire duration of Contract Time including maintenance or plant establishment period. Contractor’s Superintendent shall not be replaced without notifying and obtaining approval of Engineer in writing at least 14 Calendar Days in advance.

d All requests from Contractor for directions, clarifications, or field instructions and all response thereto shall be in writing.

## 32 CHARACTER OF WORKERS AND DISCIPLINE AMONG EMPLOYEES

a Contractor shall, at all times employ sufficient labor for completing Work in the manner and time required by Contract Documents.

b All workers shall have sufficient skill and experience to properly perform work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform such work satisfactorily.

c Contractor shall at all times enforce discipline and order among employees, and shall avoid employing on Work any person not skilled in the work assigned.

d Any person employed who is found to be incompetent, intemperate, troublesome, disorderly, or who fails or refuses to perform Work properly and acceptably, shall be immediately removed from Work by Contractor and not be reemployed on Work.

## 33 CHANGES IN WORK

a City reserves the right, without notice to the sureties, at any time during the life of Contract and without invalidating same, to change Drawings, Specifications, character of Work, quantity of Work, or time within which Contract is to be completed, provided the total arithmetic dollar value of all such changes, both additive and deductive, does not exceed 25 percent of the total Contract price. Should it become necessary to exceed this limitation, the change shall be by written supplemental agreement between Contractor and City, unless both parties agree to proceed with the change by Change Order.

b In giving instructions, Engineer shall have authority to make Changes in Work not involving extra cost when such changes are necessary or expedient to the satisfactory performance and completion of Work.

c Engineer, by written order to Contractor, approved by Executive Director, shall have authority to implement Changes in Work, and/or to grant extensions of time, provided that Changes in Work and/or extensions of time which increase or decrease Contract price by more than $150,000 in any one authorization, and all time extensions in excess of one year, shall become effective only after authority is granted by Board.

d Except in an emergency endangering life or property, no Changes in Work involving additions to Contract price shall be made unless in pursuance of such written order, and no claim for an addition to Contract price shall be valid unless the additional Work was so ordered.

## 34 COST-PLUS CHANGE ORDER WORK (CHANGE ORDERS)

a If it is impossible or impracticable to ascertain the total cost of Changes in Work to be done before such work is begun, or if no agreement can be reached on Changes in Work and additions to Contract price, then Engineer may issue a Cost-Plus Change Order (Change Orders) instructing Contractor to do Work, indicating expressly and unmistakably the intention to treat the items as Changes in Work, setting forth the kind, character and limits of Work as far as can be ascertained, the terms under which changes to Contract price shall be determined and the estimated total change in Contract price anticipated thereunder. Change Order shall be fully executed by Department and accepted by Contractor before any Work is started on the items covered by the order. Such Change Order shall become the basis for a later Authority for Adjustment when the amount of adjustment to Contract price can be determined, and the prior approval of Change Order shall be considered necessary authority within the limits of the estimated change in Contract price. Without additional authority, no costs exceeding the estimated amount shall be paid.

b Contractor shall maintain records sufficient to distinguish the direct cost of Change Order Work from the cost of other operations.

c Costs in a Change Order shall be determined as follows:

1 Labor costs shall be based on the prevailing wage scale for each craft or type of worker. Cost of payroll taxes and insurance, health and welfare, pension and vacation are allowable, subject to Contractor's submitting adequate documentation to substantiate cost.

2 Material costs shall be the cost of all materials purchased by Contractor and used in Cost-Plus Change Order Work and shall be the actual cost of such materials, including sales taxes, freight and delivery charges. City reserves the right to approve materials and sources of supply of materials furnished by Contractor, or, if necessary, to facilitate the progress of Work, to furnish the materials to Contractor.

3 Contractor shall be allowed rental for the time that machinery or equipment is required based on the applicable Equipment Rental Rates published by the State of California, Department of Transportation, Division of Construction, current on date of performance of Work; when machinery and equipment not so listed is required, a reasonable rental shall be allowed. In addition, Contractor shall be allowed reasonable move-in and move-out charges on heavy equipment.

01000.34 Cont'd.

4 Equipment and tools having a replacement value of $500 or less, whether or not consumed by use, shall be considered small tools and no payment shall be made therefor.

d Contractor shall notify Inspector at the beginning of each day when Change Order Work is being performed. Contractor shall describe the personnel involved, whether by Contractor forces or by its subcontractors at any tier. Failure to notify Inspector prior to the start of Change Order Work serves as Contractor's waiver to claim for compensation on that day.

e At the end of each day when Change Order Work is performed, Contractor [not subcontractor(s)] shall furnish to Inspector, on Port of Los Angeles Construction Division Time and Material Form, reports of Cost-Plus Work for that day. Form is included at the end of this Section.

The reports shall:

1 Identify party (Contractor or subcontractors at any tier) performing Work.

2 Show names of workers, classifications, and hours worked.

3 Describe and list quantities of materials used.

4 Show type of equipment, size, identification number, and hours of operation, including loading and transportation, if applicable.

5 Describe other services and expenditures in such detail as Engineer may require.

An attempt shall be made to reconcile the report daily, and it shall be signed by Inspector, the subcontractor performing Work (if applicable) and Contractor. In the event of disagreement, pertinent notes shall be entered by each party to explain points which cannot be resolved immediately. Each party shall retain a signed copy of the report. Reports by subcontractors or others shall be submitted through Contractor.

In the event that more than one Change in Work is performed by Contractor in a Calendar Day, Contractor shall maintain separate records of labor, construction equipment, and materials for each such change. In the event any subcontractor of any tier shall provide or perform any portion of any changed work, Contractor shall require that each such subcontractor maintain records in accordance with this Subsection.

01000.34 Cont'd.

f All Change Order reports to be submitted on the day that Work is performed, shall be signed by the subcontractor (if applicable) and Contractor or authorized representative, and witnessed by Inspector. Engineer's signature on the report shall indicate agreement with the information reflected therein (except when disagreements remain and each party has placed notes as to the disagreement on the form), not that Contractor is entitled to payment of the costs in the report.

g A subsequent report, also on Port of Los Angeles Construction Division Time and Material Form, shall be submitted by Contractor to Engineer within 5 business days after the date that Work was performed. In addition to the information included in the report required on the day that Work is performed, this subsequent report shall itemize all costs for labor, materials, and equipment rental and give a total of costs to date for Change Order Work. This report shall be accompanied by all receipts, delivery tickets, and other documentation that verifies the identified costs.

h Engineer shall compare Engineer's records with Contractor's reports, make the necessary adjustments, and compile the costs of Change Order Work. When such corrected reports are agreed upon and signed by both parties, they shall become the basis of payment. The total cost to City for Work covered by Change Order directive shall under no circumstances exceed a price that is reasonable, competitive and fair to City given the amount of and type of Work involved and the circumstances under which the change is performed. In the event that Contractor shall fail or refuse, for any reason, to maintain or make available for inspection, review, and/or reproduction of such records, adjustments to Contract price or Contract Time, if any, on account of any change to Work may be deemed waived for that day. Contractor's obligation to maintain back-up records hereunder is in addition to, and not in lieu of, other Contractor obligations under Contract Documents with respect to Changes in Work.

i Contractor is responsible for tracking costs and for notifying Engineer in writing when costs approach 50% and 75% of the estimated total change in Contract price set forth in Change Order. In addition, if Changed/Extra Work cannot be completed within the estimated total change in Contract price set forth in Change Order, Contractor shall notify Engineer in writing, and in a timely manner, that the limit requires an increase. City shall only reimburse eligible costs up to the estimated total change in Contract price set forth in Cost-Plus Change Order.

j City may authorize and approve payment for necessary services and expenditures other than labor, materials, and equipment rentals.

01000.34 Cont'd.

k Materials, equipment rental and other costs shall be substantiated by vendors' invoices submitted with the current reports; or, if not then available, shall be submitted with subsequent reports. If vendors' invoices are not submitted within 30 days after completion of the Cost-Plus Work or if in the opinion of Engineer the cost of materials is excessive, then the cost of such items shall be deemed to be the lowest current wholesale prices at which the items are available in the quantities required, delivered to Project Site and any Laydown Area(s), less cash or trade discounts.

35 AUTHORITY FOR ADJUSTMENTS

a An Authority for Adjustment (AFA) is a document that changes Work and adjusts Contract price. An AFA may be utilized in one of the following manners:

1 A written order implementing Changes in Work for which a total cost has been negotiated prior to the issuance of the order. It is issued by Engineer and expressly indicates the intention to treat the items described therein as Changes in Work. It shall also contain the terms and amount of adjustment to Contract price. In this case, AFA shall be issued and executed before any work is started on the items covered by the order.

2 To finalize (or close-out) one or more Change Orders, or Work initially authorized by Change Order.

3 To adjust the estimated quantities of unit price bid items, and contingency items to agree with the actual quantities required. No mark-up fees shall be allowed for these adjustments.

b Mark-up fees in an Authority for Adjustment for paragraphs a, 1 (negotiated AFAs) and a, 2 (finalized Change Orders) above shall be determined as follows:

1 When extra Work is performed by one or more subcontractors other than Contractor, total mark-up fees shall be 15 percent, broken down as follows: 10 percent for the one or more subcontractors performing Work, and 5 percent for Contractor and all upper tier subcontractors, as shown in Example 1 below.

01000.35 Cont'd.

Example 1:

| | |
|---|---|
| Value of extra Work: | $100,000 |
| Mark-up fees shall be broken down as follows: | |
| 10 percent of value of extra Work for one or more Subcontractors performing Work | $ 10,000 |
| 5 percent of value of extra Work for Contractor and all upper tier subcontractors | $ 5,000 |
| Total AFA amount | $115,000 |

2 When Work is performed by Contractor only, mark-up fees shall be 10 percent, as shown in Example 2 below.

Example 2:

| | |
|---|---|
| Value of extra Work: | $100,000 |
| Mark-up fees shall be 10 percent of value of extra Work performed by Contractor | $ 10,000 |
| Total AFA amount | $110,000 |

3 When part of Work is performed by Contractor and part of Work is performed by one or more subcontractors, mark-up fees shall be as shown in Example 3 below.

Example 3:

| | |
|---|---|
| Value of extra Work: | $100,000 |
| Assume $40,000 performed by Contractor and $60,000 performed by one or more subcontractors. | |
| For $40,000 performed by Contractor, mark-up shall be 10 percent of value of extra Work performed by Contractor | $ 4,000 |
| For $60,000 performed by one or more subcontractors, mark-up fees shall be as follows: | |
| 10 percent of value of extra Work for one or more subcontractors performing Work | $ 6,000 |
| 5 percent of value of extra Work for Contractor and all upper tier subcontractors | $ 3,000 |
| Total AFA amount | $113,000 |

4 No percentage shall be paid to Contractor for any material furnished by Department. Where the portion of a change involves credit items for Contract Work not being performed by Contractor or subcontractor on any tier, Contract Work not being performed shall be deducted prior to adding the mark-up fee.

01000.35 Cont'd.

5 Mark-up fees shall apply to labor premium time for Change Order Work, when labor premium time is approved by Engineer.

6 Contractor's mark-up fee percentage shall be considered to include all costs over and above the direct cost of the changed Work, including, but not limited to, the cost of preparing and furnishing all required reports and records sufficient to distinguish the direct cost of Change Order Work from the cost of other operations, overhead, profit, bond premium adjustment, insurance, field and office supervision, preparation of estimates, engineering, scheduling, use of small tools, incidental job burdens, general home office expenses, any impact costs, and other miscellaneous costs.

c Should any lump sum bid item be eliminated in its entirety, or otherwise reduced in scope of Work, payment shall be made to Contractor for Contractor's actual costs incurred in connection with the elimination or reduction in scope of Work. Allowances for overhead and profit shall be based on the actual cost incurred and shall be determined pursuant to Cost-Plus Change Order Work (Change Orders) Subsection. Contractor shall not be entitled to retain any overhead or profit mark up for the reduced quantity of Work eliminated by Engineer.

d If material conforming to Drawings and Specifications is ordered by Contractor for use in the bid item prior to the date of notification of elimination or scope reduction by Engineer, and if the order for the material cannot be canceled or returned without charge, payment shall be made to Contractor for the actual cost or charges for the material. In this case, if the material cannot be returned and payment has been made, the material shall become the property of Department. Department shall also pay Contractor reasonable and necessary charges for handling said material.

36 FORCE ACCOUNT WORK

a If no agreement can be reached on Changes in Work and additions to Contract price, or Contractor refuses to accept an Authority for Adjustment or Cost-Plus Change Order, Executive Director shall have the right to have Work in question done by persons, firms or corporations other than Contractor, or to perform the same by utilizing either City's own forces or forces of Contractor on the basis specified in Authority for Adjustments Subsection and Cost-Plus Change Order Work (Change Orders) Subsection of this Section.

## 37 REQUEST FOR ADDITIONAL COMPENSATION

a If Contractor alleges that instructions issued after the date of Contract shall result in increases in Contract price, Contractor shall give Engineer written notice thereof within seven Calendar Days after the receipt of such instructions, and in any event before proceeding with Work, except in an emergency endangering life or property. The procedure for accounting for costs shall then be as provided in Cost-Plus Change Order Work (Change Orders) Subsection of this Section. No such notice or request for additional compensation resulting therefrom shall be considered unless Contractor complies with the requirements of this Subsection.

b If Contractor submits a request to Engineer, for additional compensation for any kind of extra Work, said request when filed shall include all necessary evidence to support it. Engineer shall have the right to audit Contractor's request, including the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to verify all costs incurred or which may be incurred and for which a request has been submitted. The right to audit shall include the right to inspect Contractor's plants, or such parts thereof as may be or have been engaged in the performance of Contract.

c Contractor further agrees that the right to audit encompasses all subcontracts and is binding upon all subcontractors. The rights to examine and inspect herein provided shall be exercisable through such representatives as Engineer chooses, during Contractor's normal business hours at the office of Contractor. Contractor shall make available to Engineer for auditing all relevant accounting records and documents, and other financial data, and upon request, shall submit true copies of records requested to Engineer. Contractor shall keep all such books and records locally.

## 38 EMERGENCY WORK

a In an emergency endangering life or posing clear and imminent danger of grievous property damage, Contractor, without special instructions or authorization from Engineer, shall act to prevent such loss or injury until such time as Engineer can be contacted for an assessment of the situation. Contractor shall also so act, without appeal, if so authorized or directed by Engineer. Any compensation requested by Contractor on account of such emergency work, shall be determined by negotiation and agreement between Contractor and City.

b Contractor shall maintain records sufficient to distinguish the direct cost of emergency work from the cost of other operations and shall itemize all costs for labor, material, and equipment rental in connection with emergency work.

## 39 TEMPORARY SUSPENSION OF WORK

a Engineer may at any time suspend Work, or any part thereof, by giving notice to Contractor in writing ordering suspension of Work for such period as deemed necessary when, in Engineer's opinion, the suspension is necessary to protect the interest of City for any reason whatsoever.

b Contractor shall comply immediately with any written order of Engineer suspending Work. Such suspension shall be without liability to Contractor on the part of City excepting only for such liability as specified in Extensions of Time and Compensable Delays Subsection of this Section.

## 40 UNAUTHORIZED WORK

a Construction or demolition beyond the lines given and grades shown on Drawings, or any extra Work done without written authority, shall be considered as unauthorized and at the sole cost and expense of Contractor, and shall not be measured or paid for. Construction so done may be ordered removed and demolition so done may be ordered restored at Contractor's sole cost and expense.

b Upon failure on the part of Contractor to comply with any order of Engineer made under the provisions of this Subsection, Engineer shall have authority to cause the order to be done by others, and to deduct the costs from any money due or to become due Contractor.

## 41 CONTRACTOR TO ABIDE BY APPLICABLE LAWS

a At all times in its performance of Contract, Contractor, at Contractor’s sole cost and expense, shall comply with all Applicable Laws pertaining to Work, Project Site, and any Laydown Area(s). Contractor is presumed to know both the existence and applicability of such Applicable Laws.

b Contractor shall adhere to the provisions of the California Labor Code including but not limited to those provisions concerning minimum wages, the 8-hour day and 40-hour week, overtime, Saturday, Sunday, and holiday work. Contractor shall forfeit to City the penalties prescribed in the California Labor Code for violations.

c Contractor shall have at Project Site, copies, or suitable extracts of: Construction Safety Orders and General Industrial Safety Orders issued by the State Division of Industrial Safety. Contractor shall comply with provisions of these and all other applicable laws, ordinances, and regulations.

## 42 EXPLOSIVES

a Explosives may be used only when authorized in writing by Engineer, or as otherwise stated in Contract Documents. Explosives shall be handled, used, and stored in accordance with all applicable regulations.

b Engineer's approval of the use of explosives shall not relieve Contractor from the liability or responsibility for claims arising from the use, handling, transportation, or storage of explosives by Contractor or from blasting operations.

## 43 PROPRIETARY NAMES AND SUBSTITUTIONS

a Whenever any equipment, material, or process is indicated or specified by patent or proprietary name, or by name of manufacturer, such reference is used to establish the type, function, and quality required. Unless the name is followed by words indicating that no substitution is permitted, such references shall be deemed to be preceded by the words "equal and similar to". Contractor may offer any equipment, material, or process for which Contractor submits data supporting that such are substantially equal to that indicated or specified. Final determination of the acceptability of such substitute items shall rest with Engineer. Engineer may consider the strength, appearance, durability, reliability, dimension, finish, efficiency, maintainability, service history, life cycle cost, and other characteristics of the proposed substitute in making that determination.

b A substitute item shall be a standard, catalogued product of a company regularly engaged in the manufacture of such items. No custom or prototype substitutes shall be accepted. Contractor shall certify that a substitute item shall perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance, and be suited to the same use as the specified item. Contractor shall identify all differences between the proposed substitute and that specified, and state whether or not acceptance of the proposed substitute shall require a change in Contract Documents to adapt the design to the proposed substitute. Any redesign or Changes in Work resulting from acceptance of a substitute shall be at the sole cost and expense of Contractor. Contractor shall furnish such data concerning and perform such testing of the proposed substitute as may be required by Engineer to evaluate the substitute item and determine if it is substantially equal. Additional information requested by Engineer shall be furnished by Contractor within 10 Calendar Days of such request.

01000.43 Cont'd.

c Offers of substitute items shall be made within the first 25 percent of Contract Time. Where CONTRACT Section requires multiple Contract Times, offers of substitute items shall be made within the first 25 percent of Contract Time for the items of Work in which the substituted items are proposed to be incorporated. Contractor shall allow Engineer 28 Calendar Days review time to evaluate substitute items unless otherwise stated in Specifications. No extension of Contract Time shall be authorized for any circumstance developing from the provisions of this Subsection. Failure to comply with the provisions of this Subsection shall be sufficient cause for rejection of a proposed substitute.

44 PATENT RIGHTS

a Contractor agrees to save, keep, hold harmless, and fully indemnify City and any of its officers or agents from all damages, cost, or expenses in law or equity that may at any time arise or to be set up for any infringement of the patent rights of any person or persons, or corporations in consequence of the use by City, or by any of its officers or agents, of articles supplied under Contract, and of which Contractor is not the patentee or assignee, or which Contractor is not lawfully entitled to sell.

b The patent fees or royalties on any patented article or process which may be furnished or used in Work shall be considered as included in the cost of the various items of Work and no separate or extra payment shall be made therefor, regardless of whether notice of patent has or has not been included in any of the documents.

45 HOUSEKEEPING AND MAINTENANCE OF SURFACE AREAS OF PROJECT SITE AND ANY LAYDOWN AREA(S)

a Throughout all phases of construction, including suspension of Work, and until final acceptance of Project, Contractor shall keep the surface of Project Site and any Laydown Area(s) clean and free from rubbish and debris. Contractor shall also abate dust nuisance by cleaning, sweeping, and sprinkling with water, or other means as necessary. The use of water resulting in mud on streets and paved areas shall not be permitted as a substitute for sweeping or other methods.

b Care shall be taken to prevent spillage on haul routes. Any such spillage shall be removed immediately and the area shall be cleaned.

c Should conditions warrant, Contractor shall furnish and operate a self-loading motor sweeper with spray nozzles as necessary to keep paved areas acceptably clean wherever construction, including restoration, is incomplete.

01000.45 Cont'd.

d The Contractor shall not discharge smoke, dust, or any other air contaminants into the atmosphere in such quantity as shall violate the regulations of any legally constituted authority.

e Prior to completion of Work, Contractor shall remove all plant, tools, equipment and materials, and shall thoroughly clean Project Site and any Laydown Area(s) and leave it with a neat, clean appearance to the satisfaction of Engineer.

46 PROTECTION OF HARBOR WATERS

a Contractor shall keep materials away from drainage structures and the harbor. Contractor shall not allow lumber, blocking, chips, loose piles, rubbish, and all flotsam, jetsam, and contaminants of whatever nature to be deposited in harbor waters. If any of the above should be found floating near Project Site and any Laydown Area(s) or submerged which might detrimentally affect navigation or water quality, it shall be immediately removed by Contractor.

47 PROJECT SITE AND ANY LAYDOWN AREA(S) SECURITY

a Contractor shall keep Project Site and any Laydown Area(s) secure at all times. Contractor shall provide the security fencing, either temporary or permanent to meet this requirement.

48 PUBLIC CONVENIENCE AND PROTECTION

a Contractor shall be responsible for protection of public and private property adjacent to Project Site and any Laydown Area(s) and shall exercise due caution to avoid damage to such property.

b The access rights of the public and lessees of adjacent property shall be considered at all times. Unless otherwise authorized, traffic shall be permitted to pass through Work or an approved detour shall be provided.

c Unless otherwise authorized, Work shall be performed in only one-half of a roadway at one time. One-half shall be kept open and unobstructed until the opposite side is ready for use. If one-half a street only is being improved, the other half shall be conditioned and maintained as a detour.

01000.48 Cont'd.

d Contractor shall provide and maintain all necessary barriers, guards, lights, signs, temporary crossings, flag persons and watchpersons, advise the public of detours and construction hazards and comply with all applicable State, County, and City requirements for closure of streets and Federal and State requirements for use of navigable waters. Contractor shall also be responsible for compliance with additional public safety requirements which may arise during construction. Contractor shall furnish and install, and upon completion of Work, promptly remove all signs and warning devices.

e Contractor shall not interfere with navigation.

49 TEMPORARY UTILITIES

a Contractor shall furnish, install, maintain, and remove all temporary light, power, and water, including piping, wiring, lamps, and other equipment, necessary for Work. Contractor shall not draw water from any fire hydrant, except to extinguish a fire, without first obtaining permission from the water agency concerned.

50 SANITATION

a Contractor shall provide and maintain enclosed toilets for the use of employees engaged in Work. These accommodations shall be maintained in a neat and sanitary condition. They shall also comply with all applicable laws, ordinances, and regulations pertaining to the public health and sanitation.

b Sewage flows shall not be interrupted. Should Contractor disrupt existing sewer facilities, sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be permitted to flow in trenches, be covered by backfill, or flow into Harbor waters.

51 RAILROAD TRACKS

a City does not guarantee that railroad tracks shall be free from trains and standing cars. Contractor shall exercise such care as shall prevent the displacement, injury or obstruction of any railroad tracks encountered in Work. In case it shall be necessary to protect, raise, lower, displace, or remove railroad tracks for the proper construction of Work, Contractor shall notify the operating railroad and obtain all necessary permission to perform the track work, or have Work performed, as the case may require.

## 52 CONSTRUCTION SCHEDULE

a Unless otherwise specified, Contractor shall submit a proposed construction schedule to Engineer for review not later than 15 Calendar Days after Notice to Proceed. Failure to submit a schedule within the stated time may result in the withholding of the first progress payment.

b The schedule shall identify all major construction elements, their start date and duration and shall reflect completion of all Work under Contract within the specified time and in accordance with Specifications.

c Seven copies of the schedule shall be submitted on substantial paper of a reasonable and convenient size for handling and filing. Language, symbols, and notations shall be those commonly employed in construction scheduling.

d The time base for reporting construction tasks shall be a regular working day taking into consideration all non-working days.

e The time base for reporting milestones shall be Calendar Days.

f The schedule shall be revised and updated monthly to reflect adjusted event dates, activity completions, additions to Work and late completion time. The schedule shall be revised and resubmitted for Engineer's review whenever Contractor desires to make changes in methods of operation, and whenever the schedule fails to reflect the actual progress.

g Contractor shall include the cost of scheduling and updating the schedule in the prices bid for Work.

## 53 EXTENSIONS OF TIME AND COMPENSABLE DELAYS

a Contractor's obligations for the performance and completion of Contract within Contract Time are of the essence of Contract. Contractor shall complete the performance of Contract within the time stipulated or within such time as may be extended by City pursuant to Changes in Work Subsection of this Section. Contractor shall be responsible for providing, maintaining, and paying all costs associated with administering and managing Contract including field and home office personnel, materials, equipment, tools, construction trailers, and any other items necessary until the end of Contract Time including any maintenance or plant establishment period.

b Extension of time, when granted, shall be based upon the effect of delays to Project as a whole and shall not be granted unless it can be shown that such delays did, in fact, delay the progress of Project as a whole.

01000.53 Cont'd.

c The time of completion shall be extended only if, in the opinion of Engineer, Contractor is necessarily delayed in completing Contract by a cause that meets all of the following conditions:

1 Such cause is beyond Contractor's control and arises without Contractor's fault;

2 Such cause arises after the opening of bids and neither was nor could have been anticipated before bid opening. Tide conditions shall be conclusively deemed to have been anticipated before opening of bids.

3 The effect of such cause could not be anticipated and avoided or mitigated by the exercise of all reasonable precautions, efforts and measures by Contractor, including re-planning, scheduling, and rescheduling.

d Notwithstanding the provisions of Paragraph c.2 of this Subsection above, a time extension may also be granted for delays caused by precipitation or Stage II Smog Alerts (at the South Coast Air Quality Management District Source Receptor Area 4) subject to the other requirements of this Subsection. However, Contractor shall not be entitled to compensation or additional payment due to such delays.

e Requests for extension of time for Changes in Work shall be negotiated at the time of ordering such changes or after the effects of mitigating rescheduling have become known.

f An extension of time granted shall not release the sureties from their obligations. Work shall continue and be carried on in accordance with all the provisions of Contract and said Contract shall be and shall remain in full force and effect during the continuance and until the completion and final acceptance of Work covered by Contract unless formally suspended or annulled in accordance with the terms of Contract.

g Neither the granting of an extension of time beyond the date fixed for the completion of any part of Work nor the doing and acceptance of any part of Work or materials specified by Contract after the time specified for the completion of Work, shall be deemed to be a waiver by City of City's right to abrogate Contract for abandonment or failure to complete within the time specified, or to impose and deduct damages as may be provided.

01000.53 Cont'd.

h As between Contractor and City, Contractor assumes the risk of any and all costs, expenses and liabilities which Contractor may incur in connection with all suspensions of, or delays in, performance of Contract, regardless of the length thereof, arising from all causes whatsoever including impacts by third parties, except that Contractor may be compensated for delays caused solely by the failure of City to furnish necessary rights of way, failure to provide materials shown in Contract Documents to be furnished by City, for its own convenience or benefit. If Contractor sustains loss as a consequence thereof which could not have been avoided by the judicious handling of forces, equipment and plant, there may be paid to Contractor such amount as Engineer finds to be fair and reasonable compensation for such part of Contractor's actual loss as was unavoidable. In no case, however, shall any compensation be made to cover loss of anticipated profits or indirect losses of any kind. If delays are caused by reasons other than those mentioned specifically in this Subsection, an extension of time may be granted, but Contractor shall not be entitled to compensation or additional payment due to such delays.

i If Contractor desires an extension of time or compensation for a qualifying delay, Contractor shall, within 30 Calendar Days after the beginning of the delay, file with Engineer a written request and report as to the cause and extent of the delay. The request must be made at least 15 Calendar Days before the specified completion date. Failure by Contractor to file these items within the times specified shall be considered grounds for refusal by City to consider such request.

54 LIQUIDATED DAMAGES

a If Contractor fails to complete Work covered by Contract Documents, or any portion thereof, in accordance therewith, within the time for completion stipulated, or within the time for such completion as extended, Contractor shall pay to City the sum stipulated in Contract, for each and every Calendar Day the time consumed in the execution of said Work may exceed the time allowed for that purpose, which said sum is agreed upon, fixed and determined by the parties hereto, as the liquidated damages that City shall suffer by reason of said delay and default. It is expressly understood that it shall be impracticable and extremely difficult to determine or fix the actual loss that City shall suffer by reason of delay in the performance of Work hereunder. City may deduct and retain the amount of such liquidated damages out of any money which may be due or become due Contractor. Such liquidated damages shall be City's sole monetary remedy for delay unless a court of competent jurisdiction finds the liquidated damages provisions in Contract to be invalid or unenforceable, in which case City shall retain all other remedies in law or equity, including without limitation the right to prove and recover actual damages due to delay.

01000.54 Cont'd.

b In the computation of liquidated damages for delay in completion of Work, the time taken by City or allowed a new contractor to whom award may be made for the completion of Contract, as well as the time required for advertising and awarding such new contract, shall be added to the time consumed by the original Contractor up to the date that City shall have notified the original Contractor to suspend Work, and from such total there shall be deducted the time allowed to the original Contractor for completing Work under Contract.

c Contractor shall not be assessed liquidated damages for delay in completion of Project caused by the failure of City or the owner of existing public utilities encountered to relocate same in a timely manner if such utilities are not identified on Drawings or in Specifications.

55 PARTIAL ACCEPTANCE AND USE

a At any time prior to final acceptance, City reserves the right to take over and utilize all, or any portion of, the permanent construction which has been completed, if Engineer determines that such portion of the permanent construction is not required for the operations of Contractor or the use thereof is urgently needed by City. Engineer shall notify Contractor in writing identifying the specific portion or portions of the completed Work to be so utilized or otherwise placed into service. At Engineer's discretion, City may start the guarantee period on the portion of Work being utilized from the date of such acceptance.

b Such action by City shall relieve Contractor of responsibility for injury or damages to said completed portions of the improvement resulting from use or from the action of the elements or from any other cause, except injury or damage resulting from Contractor's operation or negligence. Contractor shall not be required to re-clean such portions of the improvement before final acceptance, except for cleanup made necessary by Contractor's operations.

c At Executive Director's discretion, City may, prior to final acceptance of Contract, upon issuance of substantial completion of Project, release a portion of the retention monies being held.

d Nothing in this Subsection shall be construed as relieving Contractor from full responsibility for correcting defective Work or materials.

01000.55 Cont'd.

e In the event City exercises its right to place into service and utilize all or part of any completed permanent construction, as between City and Contractor, Contractor shall be responsible for only those injuries to persons or property caused by any willful or negligent act or omission of Contractor, subcontractor, their officers, employees or agents or those injuries for which Contractor, subcontractor, their officer, employees or agents would be strictly liable or liable under a warranty.

56 PARTIAL PAYMENTS

a In the event of a lump sum bid on all or any portion of Work upon which partial payments are to be made, Contractor shall, before the first payment becomes due, submit to Engineer a detailed schedule of prices for such units of Work as may be specified by Contractor for permanent Work accomplished and material worked into permanent place. The schedule of prices submitted shall be checked by Engineer, and, if in Engineer's opinion such unit prices appear to be reasonable and properly balanced, they shall be approved and used in the preparation of the monthly estimates. The sum of all extensions, based upon the quantities of the various items for the entire Work covered by Contract and the unit prices as approved, shall be equal to the total amount of Contract.

b Contractor shall, within two weeks after issuance of Notice to Proceed, submit to Engineer a list of rates, without markup set forth in Authority for Adjustments Subsection Paragraph b of this Section, of pay for all labor classifications [for Contractor and subcontractors (listed and not listed) at every tier] as well as hourly equipment costs (rental rates or otherwise). The list of labor rates and equipment costs submitted shall be checked by Engineer, and, if in Engineer's opinion such rates and costs appear to be reasonable, they (along with Engineer's estimate of material costs, or latest verifiable information on material costs) shall be approved and used for reference when evaluating requests for monthly partial pay for Cost-Plus Change Order Work. It is the responsibility of Contractor to request any consideration for rates that represent an increase from those presented, and agreed upon prior to the first payment. This list shall not replace Contractor's obligation to provide backup records for Cost-Plus Work nor allow Contractor to receive compensation for Cost-Plus Work greater than Contractor's actual cost plus markup under Authority for Adjustments Subsection of this Section.

01000.56 Cont'd.

c On or about the first of each calendar month, Engineer shall make an estimate in writing of all permanent Work accomplished and material permanently installed and the total amount of Work done up to the time of such estimate, and the value thereof based upon the unit price stated in the Bid Proposal Line Items or upon the prices agreed in the breakdown of a lump sum or sums stated in the Bid Proposal Line Items. When provided for in Specifications, and subject to the limitations and conditions of Acceptance and Final Payment Subsection of this Section, the cost of materials and equipment delivered but not yet incorporated in Work shall be included in the progress estimate. Contractor shall submit receipts from suppliers identifying the materials and equipment as paid for prior to the item being included in the progress estimate. The progress estimate shall be submitted to Engineer as a payment request. Upon receipt of a properly presented payment request, Engineer shall process the payment in conformance with California Public Contract Code Section 20104.50 for on time and prompt payment to Contractor. The following is a summary of California Public Contract Code Section 20104.50. For the full text, refer to California Public Contract Code Section 20104.50.

1 If City fails to make any progress payment within 30 days after receipt of an undisputed and properly submitted payment request from Contractor for this Contract, City shall pay interest to Contractor equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure.

2 Upon receipt of a payment request, City shall act in conformance with both of the following:

a) Each payment request shall be reviewed by City as soon as practicable after receipt for the purpose of determining that the payment request is a proper payment request.

b) Any payment request determined not to be a proper payment request suitable for payment shall be returned to Contractor as soon as practicable, but not later than 7 days, after receipt. A request returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.

3 The number of days available to City to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which City exceeds the 7-day return requirement set forth in Subparagraph 2 of Paragraph c of this Article.

01000.56 Cont'd.

4 A progress payment includes all payments due to Contractor, except that portion of the final payment designated by Contract as retention earnings.

5 A payment request shall be considered properly executed if funds are available for payment of the payment request, and payment is not delayed due to an audit inquiry by the financial officer of City.

d From each progress estimate, 5 percent of the amount attributable to Work, including Changes in Work and/or Authorities for Adjustment issued after the original Contract Award, shall be deducted and retained by City, and the remainder less the amount of all previous payments shall be paid to Contractor.

e Contractor shall have the right to substitute approved securities equivalent to the amount retained or request that Department deposit the amount retained in an interest bearing account. The substitution of securities or the deposit of the amount retained shall be at the expense and request of Contractor.

1 If Contractor requests to substitute securities equivalent to the amount retained, City shall place the amount retained on deposit with a state or federally chartered bank as escrow agent after approved securities have been likewise deposited by Contractor. The escrow agent shall thereafter pay the amount retained to Contractor. Contractor shall be the beneficial owner of any securities deposited subject to Paragraph (f) of this Subsection.

2 If Contractor requests City to deposit the amount retained in an interest bearing account with a state or federally chartered bank as escrow agent, City shall do so and the escrow agent shall then pay all interest on said account to Contractor. Contractor shall be the beneficial owner of said account subject to Paragraph (f) of this Subsection.

f Thirty-five Calendar Days following acceptance of Work by Executive Director and upon receipt of written notification of such fact from City, escrow agent shall release to Contractor the securities which have been placed on deposit or the amounts deposited in the interest bearing account. City has the right to order escrow agent to continue to retain necessary securities or deposits sufficient to cover such amounts required by law to be withheld pursuant to properly executed and filed notices to stop payment or as may be authorized by Contract to be further retained.

01000.56 Cont'd.

g Securities eligible for substitution are those listed in Government Code Section 16430 and also bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by Contractor and City.

h The escrow agent shall be authorized by Contractor to convert deposited securities or interest bearing accounts to cash in the event of default by Contractor and distribute the cash as instructed by City.

i Unless otherwise provided, no payment shall be made for materials delivered to Project Site and any Laydown Area(s) but not incorporated in Work.

j Payment shall not be made for materials wasted or disposed of in a manner not called for under Contract. This includes rejected material not unloaded from vehicles, materials rejected after having been placed and material placed outside of the pay lines. Such quantities shall not be included in the pay quantities. No compensation shall be allowed for disposing of rejected or excess material.

k No estimate or payment shall be required to be made when, in the judgment of Engineer, Work has not proceeded in accordance with the provisions of Contract. The value of any material or Work included in partial estimates, which may subsequently become lost, damaged, or unsatisfactory, shall be deducted from succeeding partial estimates.

57 ACCEPTANCE AND FINAL PAYMENT

a When Work has been satisfactorily completed, Engineer shall determine the quantity of Work performed and prepare the final estimate of the value including all Changes in Work subject to Changes in Work Subsection Paragraphs a through d of this Section, for acceptance by Executive Director (or Board, if necessary).

b The quantities listed in Bid Proposal Line Items do not govern final payment. Payments to Contractor shall be made only for the actual quantities of Contract items constructed in accordance with Drawings and Specifications. All prior partial estimates and payments shall be subject to correction in the final estimate of payments.

c At the expiration of 35 Calendar Days from the date of acceptance of Work by Executive Director, the amount deducted from the estimates and retained by City shall be certified by Engineer as due and in the normal course of City business shall be paid to Contractor except such amounts as are required by law or as are authorized by Contract to be further retained.

01000.57 Cont'd.

d If a notice to stop payment is filed with City due to Contractor's failure to pay for labor or materials used in Work, money due for such labor or materials, plus 25 percent prescribed by law, shall be withheld from payment to Contractor. In accordance with Section 9364 of the California Civil Code, Executive Director may accept a bond by a corporate surety in lieu of withholding payment.

e It is mutually agreed between the parties to Contract that no certificate given or payment made under Contract, except the final certificate or final payment, shall be conclusive evidence of the performance of Contract, either wholly or in part, against any claim of City, and no payments shall be construed to be an acceptance of any defective Work or improper materials.

f When Contractor has exceeded Contract Time and has not yet received an extension of time to complete Contract so that liquidated damages may be assessed, Engineer may withhold an additional amount of money to cover the amount of liquidated damages that shall accrue based on Contractor's estimated Contract completion time as confirmed by Engineer.

58 AFFIDAVIT OF COMPLETION

a Contractor shall, upon completion of Work, including final clean up and demobilization, submit to Engineer (using Forms 298-E, 297-E, or 308-E in Section 00078) a sworn affidavit to the effect that: "to the best of Contractor's knowledge and belief, Work specified in said Specifications and said Contract has been completed in strict accordance with Drawings and Specifications therefor, that no lawful debts for labor or materials are outstanding, and that no federal excise tax has been included in Contract price; that all requests for funds for undisputed Work under Contract, including Changes in Work, and under all billings of whatsoever nature are accurate, complete and final and that no additional compensation over and above the final payment shall be requested or is due under Contract or under any adjustment issued thereunder for said undisputed Work; and that upon receipt of final payment, Contractor and subcontractors acknowledge that City, Board, Executive Director, Engineer, and any and all employees of City and their authorized representatives shall thereby be released from any and all claims or liability for additional sums on account of undisputed Work performed under Contract". Disputed Contract claims in stated amounts may be excluded by Contractor from the operation of the release.

59 GUARANTEE

a Unless provided elsewhere in Specifications, Contractor guarantees all equipment, materials, and work furnished on Project against defective workmanship, material, construction, and labor for a period of one year from the date of acceptance of Project by Executive Director (following completion of Project). If the supplier or manufacturer of material or equipment provides a warranty or guarantee, Contractor's guarantee shall be in addition to any warranty or guarantee of the supplier or manufacturer and Contractor shall be a co-guarantor of such equipment and materials for a period of one year from the date of acceptance of Project by Executive Director. Contractor shall supply Department with all warranty and guarantee documents relevant to equipment and materials incorporated in Project and guaranteed by their suppliers or manufacturers.

b It shall be understood that the surety for the performance bond submitted in conformance with the terms of Contract by Contractor for Project is liable on its bond for all obligations of Contractor including guarantee provisions.

c Contractor further agrees, that within ten Calendar Days after being notified in writing by Engineer of any Work not in accordance with requirements of Contract or any defects in Work, Contractor shall commence and prosecute with due diligence all Work necessary to fulfill the terms of this guarantee, and to complete Work within a reasonable period of time, and in the event Contractor fails to so comply, Contractor does hereby authorize City to proceed to have such Work done at Contractor's sole cost and expense and Contractor shall pay the cost thereof upon demand. City shall be entitled to all costs, including reasonable attorney's fees, necessarily incurred upon Contractor's refusal to pay the above costs.

d Notwithstanding the foregoing subsections in the event of an emergency constituting an immediate hazard to the health or safety of City's employees, property or licenses, City may undertake at Contractor's sole cost and expense, without prior notice, all Work necessary to correct such hazardous condition when it was caused by Work of Contractor not being in accordance with the requirements of Contract.

60 NO PERSONAL LIABILITY

a No member of Board or Executive Director, Engineer, any other officer, agent, or authorized employee of City, shall be personally responsible for any liability arising under Contract.

61 NO ESTOPPEL

a City shall not, nor shall any department or officer thereof, be precluded or estopped by any return or certificate made or given by Engineer or other officer, agent, or employee of City under any provisions of Contract from at any time (either before or after the final completion and acceptance of Work and payment therefor) pursuant to any such return or certificate showing the true and correct amount and character of Work done, and materials furnished by Contractor or any person under Contract or from showing at any time that any such return or certificate is untrue and incorrect, or improperly made in any particular, or that Work and materials, or any part thereof, do not in fact conform to Specifications; and City shall not be precluded or estopped, notwithstanding any such return or certificate and payment in accordance therewith, from demanding and recovering from Contractor such damages as it may sustain by reason of Contractor's failure to comply with Specifications.

62 POTENTIALLY SIGNIFICANT CULTURAL MATERIAL

a If potentially significant cultural material is discovered while excavating, Contractor shall immediately cease excavation in the area of discovery and shall not resume excavation in the area until ordered to do so by Engineer. When Contractor is ordered to resume excavation operations, such operations shall be conducted as directed by Engineer.

b "Potentially significant cultural material" as used in this Subsection means artifactual material 50 years old or older.

c Any delays to Project as a whole, caused by compliance with this Subsection shall entitle Contractor to an extension of time equivalent to the period of that delay.

63 STATE TIDELANDS GRANT

a Contract is entered into in furtherance of and as a benefit to the State Tidelands Grant and the trust created thereby. Therefore, Contract is at all times subject to the limitations, conditions, restrictions, and reservations contained in and prescribed by the Act of the Legislature of the State of California entitled "An Act Granting to City of Los Angeles the Tidelands and Submerged Lands of the State Within the Boundaries of Said City," approved June 3, 1923, (Stats. 1929, Ch. 651), as amended, and provisions of Article VI of the Charter of City of Los Angeles relating to such lands. Contractor agrees that any interpretation of Contract and the terms contained herein must be consistent with such limitations, conditions, restrictions, and reservations.

64 RESPONSIBILITY FOR SUBCONTRACTORS

a Contractor shall be fully responsible to City for its acts and/or omissions and for the acts and/or omissions of persons directly employed by Contractor. Additionally, Contractor shall be fully responsible to City for the acts and/or omissions of subcontractors and of persons or entities either directly or indirectly employed by subcontractors. Nothing contained in Contract Documents shall create or be construed as creating a contractual relationship between any subcontractor of Contractor and City.

65 CONTRACTOR'S LIABILITY FOR HAZARDOUS WASTES OR HAZARDOUS SUBSTANCES

a As to Environmentally Regulated Materials whose existence on Project Site and any Laydown Area(s) commenced prior to the effective date of Contract, City shall not seek to hold Contractor liable as an owner, operator, generator, or discharger of such Environmentally Regulated Material.

b Provided that it has complied with all provisions of Contract, including but not limited to Protection of Harbor Waters Subsection of this Section, after final completion and acceptance of Work in strict accordance with Contract Documents, subject to its continuing obligations under Contract Documents (including, without limitation, its obligations under any representations, warranties, and guaranties with respect to Work performed and under Protection of Harbor Waters Subsection of this Section), Contractor shall not be responsible to City for the performance of any further remedial action, removal actions, or cleanup of hazardous waste or hazardous substances at Project Site and any Laydown Area(s) that City may be ordered, directed, or required to perform by any governmental authority after the date of final completion and acceptance of Work.

c Nothing in this Subsection shall limit or restrict the liability or responsibility of Contractor (or any of its subcontractors, consultants, employees, or agents) in the event of any failure to perform or comply with the terms of Contract, any negligence in the performance of Work, or any willful misconduct in connection with the performance of Work, nor shall this Subsection in any way limit or restrict Contractor's responsibilities under Contract and applicable law in connection with the handling, transporting, storing, or disposing of hazardous waste or hazardous substances and/or the arranging therefor.

## 66 TIME AND MATERIALS FORM

**PORT OF LOS ANGELES**
**CONSTRUCTION DIVISION**

CO No.: _____ Page _____ of _____

**TIME AND MATERIAL FORM**

Contractor: _____
Address: _____
License No.: _____ Phone: _____

Project Title: _____
Spec No: _____ Plan Ref: _____ RFI No.: _____
Contract No.: _____ Spec Ref: _____

Work Performed (Contractor Name): _____

Description of Work: _____

Date Performed: _____ Date of Report: _____

**LABOR**

| Name | Classification | Hours (Reg) | Hours (OT) | Unit Rate | Amount |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

*Labor Subtotal:* _____

**EQUIPMENT**

| Make and Model | Hours | Unit Rate | Amount |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

*Equipment Subtotal:* _____

**MATERIAL**

| Description | Hours | Unit Rate | Amount |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

*Material Subtotal:* _____

***Total Amount (Labor/Equipment/Material):*** _____

Signature acknowledges verification of labor and equipment quantities only. Costs and contract allowability are subject to audit verification in accordance with contract terms. Any costs determined not to be allowable for payment shall be deducted from the time sheet prior to final resolution of the change order.

| PRIME CONTRACTOR (PRINT NAME) | SUBCONTRACTOR REPRESENTATIVE (PRINT NAME) | PORT OF LOS ANGELES INSPECTOR (PRINT NAME) |
|---|---|---|
| PRIME CONTRACTOR SIGNATURE | SUBCONTRACTOR REPRESENTATIVE SIGNATURE | PORT OF LOS ANGELES INSPECTOR SIGNATURE |

## 67 DAILY FIELD REPORT

**Contractor Daily Field Report**

Page _____ of _____

**PROJECT TITLE:** _____ **SPEC NO.:** _____

**CONTRACTOR/SUBCONTRACTOR:** _____ **WORK DATE:** _____

| TYPE [1] | EMPLOYEE NAME | CLASSIFICATION | EQUIP # [2] | START TIME | END TIME | TOTAL |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| # | QTY | EQUIPMENT DESCRIPTION | HRS | # | QTY | EQUIPMENT DESCRIPTION | HRS |
|---|---|---|---|---|---|---|---|
| 2 | | | | 12 | | | |
| 3 | | | | 13 | | | |
| 4 | | | | 14 | | | |
| 5 | | | | 15 | | | |
| 6 | | | | 16 | | | |
| 7 | | | | 17 | | | |
| 8 | | | | 18 | | | |
| 9 | | | | 19 | | | |
| 10 | | | | 20 | | | |

**Contractor's Authorized Representative:**

_____
PRINT NAME AND TITLE HERE

_____ _____
SIGNATURE DATE

Los Angeles Harbor Department - Construction Division
*To be completed by the Project Inspector Only*

**INSPECTOR:** _____ _____
PRINT NAME HERE SIGNATURE

_____
DATE RECEIVED

NOTE 1: TYPE: P- Prime; SC - Subcontractor; S-Supplier; V - Vendor

NOTE 2: EQUIP # - Required if labor classification is Operating Engineer or Teamster

68 LAYDOWN AREA(S)

a Contractor use and occupancy of Laydown Area(s) shall not be revocable during the duration of Contract. Contractor shall not be required to provide payment or compensation for use and occupancy of Laydown Area(s).

b Contractor acknowledges and agrees that Laydown Area(s) is suitable for the use intended and accepts use and occupancy of Laydown Area(s) subject to each and every term and condition of the Port of Los Angeles Tariff No. 4 (Tariff) https://www.portoflosangeles.org/business/tariff, as applicable to Laydown Area(s), as if fully set forth herein. Contractor shall not alter or construct on Laydown Area(s) without first obtaining a Harbor Engineer Permit except for those alterations set forth in this Contract, and complying with Applicable Laws. Contractor shall not cause or permit any Environmentally Regulated Material to be generated, brought onto, handled, used, stored, transported from, received, or disposed of (hereinafter sometimes collectively referred to as “handle” or "handled") in or about Laydown Area(s) except for limited quantities of standard office and janitorial supplies containing chemicals categorized as Environmentally Regulated Material and except as permitted, required, or necessary in conformance with Contract Documents, if any. Contractor shall handle all such Environmentally Regulated Material in strict compliance with Applicable Laws in effect during Contractor’s occupancy.

c Contractor is aware that City’s Department of Water and Power, other utility, or other maintenance or service from or on behalf of City, may need to service or repair certain facilities on Laydown Area(s). If such repair is necessary, Contractor agrees to relocate all of its equipment and other personal property to provide such personnel adequate access. Contractor agrees to complete such relocation within 24 hours of receiving notice from City except in case of emergency. Contractor shall be entitled to an equitable adjustment in Contract Time and/or price for delays as a result of the need to relocate equipment to provide access for any repairs that are beyond the control and without the fault of Contractor and is for City's own convenience or benefit.

01000.68 Cont'd.

d Contractor shall remediate or cause the remediation of any Contamination that occurs in, on, under, or about Laydown Area(s), whether caused by Contractor or any third-party acting for or on behalf of Contractor during Contractor's occupancy, including Contamination of improvements, adjacent harbor waters, soil, sediment, groundwater, or air, or of adjacent Laydown Area(s) (including soil, sediment, groundwater, or air) and including Contamination that is considered a nuisance under Applicable Laws. Remediation shall be to the reasonable satisfaction of City, and the requirements of the applicable governmental agencies including the Regional Water Quality Control Board, by removing or effecting the removal of all Contamination including but not limited to contaminated soil, water, groundwater, sediment, or other material it may place or cause to be placed on site such that no encumbrances, such as deed or land use restrictions, be imposed on Laydown Area(s) as a result of such Contamination. In fulfilling the obligations of this Article, Contractor shall also comply with any other conditions reasonably imposed by City. If Contractor knows or has reasonable cause to believe that Contamination has occurred in, on, under, or about Laydown Area(s), Contractor shall immediately give written notice to City. Contractor shall not be responsible for any Contamination existing on, below, or about Laydown Area(s) prior to the NTP, including contamination as depicted in the baseline report.

01000.68 Cont'd.

e Contractor bears responsibility for full compliance with any and all Applicable Laws regarding the use, storage, handling, distribution, processing, and/or disposal of Environmentally Regulated Material including Contamination, regardless of whether under Applicable Laws the obligation for such compliance or responsibility is placed on the owner of Laydown Area(s), on the owner of any improvements on Laydown Area(s), on the user of Laydown Area(s), or on the user of any improvements on Laydown Area(s). Contractor shall only be responsible for Contamination caused by Contractor, or any third party acting for or on behalf of Contractor and shall not be responsible for any preexisting Contamination on Laydown Area(s) prior to Contractor's first occupancy thereof. Contractor agrees that any claims, damages, fines, or other penalties asserted against or levied on City and/or Contractor as a result of noncompliance with any Applicable Laws by Contractor under this Contract shall be the sole responsibility of Contractor and that Contractor shall indemnify and hold City harmless from any and all such claims, damages, fines, penalties, and/or judgments, as well as any costs expended to defend against such claims, damages, fines, and penalties and/or judgments, including attorneys' and experts' fees. City, at its sole option, may, after providing Contractor with a reasonable opportunity to defend such claims, damages, fines, penalties, and/or judgments pay the claims, damages, fines, penalties, and/or judgments resulting from Contractor's noncompliance with any of the aforementioned authorities, and Contractor shall indemnify and reimburse City for any such payments.

f In discharging Contractor's obligations under this Subsection only, if Contractor disposes of any Contamination, within 30 days of Contractor's receipt of original documents, Contractor shall provide City copies of all records, including a copy of each uniform hazardous waste manifest indicating the quantity and type of material being disposed of, the method of transportation of the material to the disposal site, and the location of the disposal site. Neither City, Port of Los Angeles, nor Los Angeles Harbor Department shall appear on any manifest document as a generator of such material. Contractor shall not be responsible for preexisting contamination. Contractor shall only be responsible for contamination caused by Contractor, or any third-party acting for or on behalf of Contractor, and shall not be responsible for any preexisting contamination on Laydown Area(s) prior to Contractor's first use and occupancy thereof.

01000.68 Cont'd.

g In discharging Contractor's obligations under this Subsection, Contractor shall perform any tests using a State of California Department of Health Services certified testing laboratory or other similar laboratory upon City's written approval. By signing this Contract, Contractor hereby irrevocably directs any such laboratory to provide City, upon written request from City, copies of all of its reports, tests results, and data gathered. As used in this Subsection, "Contractor" includes agents, employees, contractors, subcontractors, and/or invitees of Contractor.

h Contractor shall implement City's Harbor Department's policies, known as Best Management Practices, in order to reduce the potential for pollutants to enter Harbor waters, as follows:

1 Facility Operations: Clean and maintain facility regularly. Use dry cleaning methods whenever possible; avoid washing areas down. Do not allow sweepings or sediment to enter the storm drain or the Harbor. Collect wash water for disposal or direct to a clarifier. Do not encourage scavengers. Do not feed birds, feral cats, sea lions, or other scavengers. Recycle whenever possible.

2 Maintenance Operations: Use drip pans to prevent any drips or leaks from contacting the ground during maintenance and fueling operations. Clean spills or drips immediately using dry methods. Use spill cleanup kits to confine or contain spills. Do not hose down equipment or allow process water to enter the storm drain or the Harbor. Place tarps beneath maintenance and repair operations to prevent materials such as paint chips and metals from contacting the ground.

3 Material and Waste Handling and Storage: Train employees responsible for waste management on handling and disposal procedures. Store all hazardous and universal waste in accordance with all federal, state, and local regulations. Store all materials and waste inside and in secondary containment. If stored outside, store only in designated, covered, and contained areas. Store waste in covered, leak proof, labeled containers. Keep lids closed on all outdoor containers including dumpsters. Store all oily products (e.g. engines), batteries, tires, and metal off the ground and under cover when stored outdoors.

4 Except as may be otherwise provided in this Contract, Contractor's obligations in this Article shall survive the Termination Date of this Contract.

01000.68 Cont'd.

i Upon completion of Work, subject to Protection of Harbor Waters Subsection of Specifications, Contractor shall quit and surrender occupancy and use of Laydown Area(s) to City and shall, without cost to City, remove any and all its property and restore Laydown Area(s) to the same or as good condition as the same were in at the time of the first occupancy thereof, allowing for normal wear and tear, by Contractor. Contractor may incur additional charges and/or withholding of payment if Contractor fails to fully restore Laydown Area(s) to the reasonable satisfaction of Executive Director prior to completion of Work.

j Restoration of Laydown Area(s) must be completed at the time Contractor submits to Engineer the Affidavit of Completion (Affidavit of Completion Subsection of this Section and Forms 298-E, 297-E, or 208-E in AFFIDAVITS OF COMPLETION Section of Specifications).

END OF SECTION

I. The following is being added as Subsection 01000.69 of GENERAL CONDITIONS Section:

69 PARTNERING

a Harbor Department shall implement a cooperative partnering relationship with Contractor in order to effectively complete Contract to the benefit of both parties. The partnering shall be structured to identify and achieve reciprocal goals. It shall focus on good communication and creative cooperation to resolve problems in a timely, professional, and non-adversarial manner. The objective is to provide a quality project, safely, on time and within budget so that all are proud to contribute. The establishment of a partnering relationship shall not change or modify the terms and conditions of Contract, shall not waive any rights or remedies of the parties and shall not relieve either party of the legal requirements of Contract. The word “partnering” as used in this Paragraph denotes a facilitation concept and does not create a partnership or joint venture between the parties. A 2-day initial partnering workshop followed by quarterly follow up partnering sessions shall be conducted during the duration of Contract. Costs for the partnering facilities, including but not limited to, the facility, lodging, meals, and other incidentals associated with the partnering sessions, shall be paid under Partnering Facility allowance bid item of Bid Proposal Line Items. Department shall provide and pay for the facilitator.

II. The following language is being added as Subsection 01000.70 of GENERAL CONDITIONS Section pursuant to California Public Contract Code Section 9204, if applicable.

70 CALIFORNIA PUBLIC CONTRACT CODE SECTION 9204

(a) The Legislature finds and declares that it is in the best interests of the state and its citizens to ensure that all construction business performed on a public works project in the state that is complete and not in dispute is paid in full and in a timely manner.

(b) Notwithstanding any other law, including, but not limited to, Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2, Chapter 10 (commencing with Section 19100) of Part 2, and Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3, this section shall apply to any claim by a contractor in connection with a public works project.

(c) For purposes of this section:

(1) "Claim" means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:

(A) A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project.

(B) Payment by the public entity of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.

(C) Payment of an amount that is disputed by the public entity.

(2) "Contractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who has entered into a direct contract with a public entity for a public works project.

(3) (A) "Public entity" means, without limitation, except as provided in subparagraph (B), a state agency, department, office, division, bureau, board, or commission, the California State University, the University of California, a city, including a charter city, county, including a charter county, city and county, including a charter city and county, district, special district, public authority, political subdivision, public corporation, or nonprofit transit corporation wholly owned by a public agency and formed to carry out the purposes of the public agency.

(B) "Public entity" shall not include the following:

(i) The Department of Water Resources as to any project under the jurisdiction of that department.

(ii) The Department of Transportation as to any project under the jurisdiction of that department.

(iii) The Department of Parks and Recreation as to any project under the jurisdiction of that department.

(iv) The Department of Corrections and Rehabilitation with respect to any project under its jurisdiction pursuant to Chapter 11 (commencing with Section 7000) of Title 7 of Part 3 of the Penal Code.

(v) The Military Department as to any project under the jurisdiction of that department.

(vi) The Department of General Services as to all other projects.

(vii) The High-Speed Rail Authority.

(4) "Public works project" means the erection, construction, alteration, repair, or improvement of any public structure, building, road, or other public improvement of any kind.

(5) "Subcontractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who either is in direct contract with a contractor or is a lower tier subcontractor.

(d) (1) (A) Upon receipt of a claim pursuant to this section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.

(B) The claimant shall furnish reasonable documentation to support the claim.

(C) If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.

(D) Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. If the public entity fails to issue a written statement, paragraph (3) shall apply.

(2) (A) If the claimant disputes the public entity's written response, or if the public entity fails to respond to a claim issued pursuant to this section within the time prescribed, the claimant may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(B) Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the public entity shall provide the claimant a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. Any disputed portion of the claim, as identified by the contractor in writing, shall be submitted to nonbinding mediation, with the public entity and the claimant sharing the associated costs equally. The public entity and claimant shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this section.

(C) For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

(D) Unless otherwise agreed to by the public entity and the contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

(E) This section does not preclude a public entity from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.

(3) Failure by the public entity to respond to a claim from a contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the public entity's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

(4) Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.

(5) If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the contractor present a claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be presented to the public entity shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, the contractor shall notify the subcontractor in writing as to whether the contractor presented the claim to the public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

(e) The text of this section or a summary of it shall be set forth in the plans or specifications for any public works project that may give rise to a claim under this section.

(f) A waiver of the rights granted by this section is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) a public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in this section.

(g) This section applies to contracts entered into on or after January 1, 2017.

(h) Nothing in this section shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations.

(i) This section shall remain in effect only until January 1, 2027, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2027, deletes or extends that date.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Scope of Work: Contractor shall perform Work necessary to complete Contract in a satisfactory manner. Furnish transportation, labor, materials, equipment, mobilization, demobilization, and incidentals necessary to perform Work in accordance with Drawing Nos. 1-3302A and 1-3472A including but not limited to the following:

1. Secure necessary permits, perform coordination Work, regulatory requirements, and site environmental requirements for Project.
2. Demolition and removal Work.
3. Cut and cap/plug existing utilities, sewer, electrical, gas, oil, water, and other utility lines.
4. Earthwork including excavating, backfilling, compacting, grading of Work area, in addition to importing fill material and custom topsoil mix.
5. Construction of asphalt concrete pavement, concrete pavement, curbs, ramps, gutters, driveways, berms, and other street improvements.
6. Construction of City of Los Angeles Department of Transportation (LADOT) sewer, street lighting, striping, and traffic control.
7. Street vacations, improvements, and realignment
8. Rail crossing improvements
9. Place and compact earthfill and crushed miscellaneous base at Project Site as indicated on Drawings.
10. Apply dust control agent over graded area.
11. Site cleaning and removal of debris, equipment, and excess material from the sites upon completion of Work.
12. Construction of concrete cable supported pedestrian bridge
13. Prestressed concrete pile foundation
14. Retaining wall
15. Architectural features and finishes

16. Site furnishings
17. Soil remediation
18. Surcharge
19. Chain link and decorative fencing
20. Guard railing
21. Electrical, sanitary sewerage, storm drainage, and water distribution systems
22. Bridge lighting and site lighting
23. Restrooms
24. Signage
25. Play areas
26. Parking lots
27. Striping and pavement markings
28. Hardscaping and landscaping
29. Other Work as shown on Drawings.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 LOCATION OF PROJECT

A. Project is located in the Wilmington District in the Port of Los Angeles.

1.2 ACCESS TO PROJECT

A. Directions:

1. From the north, take the Harbor Freeway (I-110) south towards San Pedro and exit at Harry Bridges Boulevard. Turn right onto N Avalon Boulevard.

2. From the south, take the San Diego Freeway (I-405) north and exit at Alameda Street. Turn left on Alameda Street and continue onto E Harry Bridges Boulevard. Turn left onto N Avalon Boulevard.

B. Access to and from Project Site and any Laydown Area(s) by Contractor's personnel and equipment shall be coordinated with Engineer. (Refer to COORDINATION Section).

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Requirements concerning the following:

1. Existing surface conditions
2. Existing subsurface conditions
3. Character of geotechnical materials
4. Restrictions upon Contractor's use of Project Site and any Laydown Area(s)
5. On-site traffic control
6. Utility availability

B. Contractor shall review information provided and resource materials referred to in this Section, concerning geotechnical reports, existing surface and subsurface improvements and systems at Project Site and any Laydown Area(s), and temporary utility points of connection.

C. Contractor shall visit Project Site and any Laydown Area(s) and determine the conditions which may affect Work. Refer to LOCATION AND ACCESS Section for Project Site and any Laydown Area(s) access.

1.2 EXISTING SURFACE CONDITIONS

A. Project Site contains various existing improvements and structures including asphalt concrete and concrete pavements, light poles, chain link fencing and gates, railroad tracks, electric transformers, fire hydrants, guard posts, and other improvements.

B. Streets around Project Site and any Laydown Area(s) are usually heavily traveled. Trucks for the adjacent Trapac terminal queue on Harry Bridges Boulevard.

1.3 EXISTING SUBSURFACE CONDITIONS

A. Project Site and any Laydown Area(s) contains underground utilities and substructures that are either abandoned or still in service. Refer to CONTRACT DOCUMENTS Section for list of reference drawings. Refer to BASIC SITE MATERIALS AND METHODS Section for additional requirements.

1.4 CHARACTER OF GEOTECHNICAL MATERIALS

A. Earth Mechanics, Inc. has prepared a geotechnical design report of the Avalon Promenade Gateway dated January 16, 2025, Project Number 23-106.

B. Earth Mechanics, Inc. has prepared a geotechnical design report of the foundation support for the proposed Avalon Promenade Pedestrian Bridge dated March 19, 2024, Project Number 17-132.

1.5 CONTRACTOR'S USE OF SITE

A. Contractor’s storage site shall be located within Project Site and any Laydown Area(s). Security of Project Site and any Laydown Area(s) shall be the responsibility of Contractor.

B. Upon completion of Work, remove temporary facilities and utility installations, equipment, tools, excess materials, and debris from Project Site and any Laydown Area(s) and leave Project Site and any Laydown Area(s) in clean condition. Clean grease and oil spills and concrete waste in conformance with REGULATORY REQUIREMENTS Section.

1.6 ON-SITE TRAFFIC CONTROL

A. Obtain approval from Engineer for Contractor’s equipment and vehicle traffic routes within Project Site.

B. Provide temporary traffic controls such as flag persons, signs, and barricades necessary to control traffic on Department property during the phases of construction, including traffic movements of adjacent contractor’s activities through Project Site and any Laydown Area(s), in conformance with the California Manual of Uniform Traffic Control Devices (California MUTCD).

C. Regulate speed on Project Site and any Laydown Area(s) to avoid generating dust or spillage.

D. Traffic speeds on unpaved roads shall be reduced to 15 miles per hour (mph) or less.

E. Schedule construction activities that affect traffic flow on the arterial system to off-peak hours to the extent practicable.

F. Contractor shall notify City of Los Angeles Department of Transportation to bag parking meters 10 working days before traffic control is implemented and before construction begins on Harry Bridges Boulevard, Broad Street, Avalon Boulevard, and A Street.

1.7 UTILITY AVAILABILITY

A. No facilities are available for temporary water connection within Project Site. Obtain Engineer's approval to obtain construction water via temporary pipe connections to fire hydrants outside Project Site. Contact the Department of Water and Power to arrange temporary water points of connection and metering. A water storage tank may be used.

B. Verify location of temporary electrical point of connection with Engineer.

C. Refer to BASIC SITE MATERIALS AND METHODS Section for additional information.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Notification and coordination requirements:

1. Coordination with railroad

B. Project meetings

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. For railroad flag persons, payment for Work of this Section shall be paid under the corresponding Railroad Flag Person(s) bid item of Bid Proposal Line Items.

1.3 REFERENCES

A. 49 CFR 214 - Railroad Workplace Safety.

1.4 NOTIFICATION AND COORDINATION REQUIREMENTS

A. Coordinate Work with other contractors, tenants, and City workers who may be working in or are adjacent to Project Site and any Laydown Area(s).

B. Coordinate Work with Department tenants having utilities or pipelines on Project Site and any Laydown Area(s) or occupying facilities adjacent to Project Site and any Laydown Area(s).

C. Coordinate installation and location of temporary utilities with Engineer and tenants.

D. Contractor shall furnish the tenants with a construction schedule for Work within the tenant's areas.

E. Instructions or orders received by Contractor from regulatory agencies, tenants, utility, or pipeline owners that are in conflict with this Section shall be brought to the immediate attention of Engineer.

F. Coordinate construction activities with adjacent contractors and Department Construction and Maintenance (C&M) crews through Engineer as shown on Drawings and described in this Section.

G. For electrical power shut down, contact Department's C&M Division by contacting Engineer 2 working days before shut-down is needed.

H. Other contractors, C&M crews, or tenants shall be working at irregular time intervals within Project Site and any Laydown Area(s) limits concurrent with Contractor's Work.

1. There shall be no additional charge resulting solely from the presence of other entities authorized by Engineer to work within Project Site and any Laydown Area(s) limits.

I. Representatives of the following agencies, tenants, and companies shall be notified in writing, as applicable, 10 working days before Work is started in areas affecting them, unless Engineer directs otherwise:

| Company or Agency | Contact | Telephone |
|---|---|---|
| | | |
| South Coast Air Quality Management District (SCAQMD) Toxics Section | | (909) 396-2327<br><br>fax (909) 396-3342 |
| | | |
| City of Los Angeles Fire Department | Battalion Chief | (310) 548-7516 |
| | | |
| Banning's Landing Community Center | Tina Escobar | (310) 847-7704 |
| | | |
| Harbor Generating Station - Los Angeles Department of Water and Power | Matthew Pearne, Station Manager | (310) 522-1311<br>(213) 840-9850 |
| | | |
| Electrical Power - Los Angeles Department of Water and Power | Chris Rodriguez | (310) 522-1709 |
| | | |
| Electrical Service - Department Construction and Maintenance Division | | through Engineer |
| | | |
| Water Service - Los Angeles Department of Water and Power | Nikki Kiem<br>Annika Tan | (213) 367-2096<br>(213) 367-3928 |

| Company or Agency | Contact | Telephone |
|---|---|---|
| | | |
| Water Service - Department Construction and Maintenance Division | | through Engineer |
| | | |
| Gas Service - Southern California Gas Company | Louie Flores | (310) 605-4172 |
| | | |
| Gas Service - Department Construction and Maintenance Division | | through Engineer |
| | | |
| Telephone Service - AT&T | Business Office | (800) 310-2355 |
| | | |
| AT&T building service cable, AT&T backbone cable and adjustment of phone company maintenance holes | Kosal Sieng | (310) 200-7228 |
| | | |
| Removal and installation of phone booths: | | (800) 924-3666 |
| | | |
| 11th US Coast Guard District Waterways Management | Waterways Aids to Navigation (W.A.N.) and Notice to Mariners | (310) 521-3860 |
| | | |
| U.S. Coast Guard Sector Los Angeles - Long Beach | Captain of Port of Los Angeles Captain Ryan Manning | (310) 521-3606 |
| | | |
| Pacific Harbor Lines (PHL) | Monte Stokes | (310) 984-5780 |

| Company or Agency | Contact | Telephone |
|---|---|---|
| | | |
| California Public Utilities Commission (CPUC) | Matthew Cervantes | (213) 440-5125 |

J. Department Emergency Contacts:

| Company or Agency | Contact | Telephone |
|---|---|---|
| | | |
| Port Police | Watch Commander<br>Emergencies | (310) 732-3491<br>(310) 732-3500 |
| | | |
| Port Pilots | Chief Pilot<br>Dispatch (24 hours) | (310) 732-3808<br>(310) 732-3805 |

K. Emergency spill contacts-in the event of a spill in harbor waters:

| Company or Agency | Contact | Telephone |
|---|---|---|
| | | |
| U.S. Coast Guard National Response Center | | (800) 424-8802 |
| | | |
| U.S. Coast Guard Command Duty Office | | (310) 521-3805 |
| | | |
| Office of Emergency Service | | (800) 852-7550 or<br>(916) 845-8911 |
| | | |
| Department of Fish and Wildlife | 24 hour contact number | (916) 445-0045 |
| | | |
| Los Angeles County Fire Department Hazardous Materials Unit | Emergency Response Coordinator | (323) 890-4317 |

L. Excavating and Digging:

1. Contractor shall provide 2 working days notice prior to excavation Work.

| Company or Agency | Contact | Telephone |
|---|---|---|
| | | |
| Underground Service Alert (USA) | | (800) 422-4133 or 811 |

1.5 PROJECT MEETINGS

A. Preconstruction Meeting: Attend preconstruction meeting scheduled by Engineer. Meeting activities:

1. Contractor shall introduce Project team and present a preliminary schedule, activity coding plan, and work force requirements.

2. Engineer shall review administrative procedures with Contractor.

3. A representative of City of Los Angeles Office of Contract Compliance shall present labor compliance requirements.

4. Other Project stakeholders may also attend preconstruction conference, including tenant at Project Site and any Laydown Area(s) and tenants adjacent to Project Site and any Laydown Area(s).

1.6 COORDINATION WITH RAILROAD

A. General:

1. Maintenance and inspection programs are and shall continue to be provided by PHL or its agents on the track, switches, ballast, ties, signals, instrument shelters, and other rail infrastructure. Coordinate Work with PHL and its inspection agencies such that PHL inspectors can be on-site and fully knowledgeable of the modifications being performed on PHL-operated tracks.

B. Railroad Flag Persons: Provide railroad flag persons in conformance with U.S. Department of Transportation’s Federal Railway Administration (FRA) requirements and REGULATORY REQUIREMENTS Section. Coordinate with PHL and provide payment in advance to PHL for railroad flag persons. Arrange with PHL to provide the flag persons required to accomplish Work. Refer to Appendix "B" of Specifications for Railroad Flagging Agreement, Flagging Policy, and Rate Schedule.

C. Scheduling of Work and Safety Requirements:

1. Coordinate and schedule Work so that the construction activities do not interfere with railroad operations.

2. Any time Work is performed within 20 feet of the track centerline, Contractor shall provide protection for workers in conformance with FRA and railroad worker safety rules, 49 CFR 214.49 CFR 214.

   a. For Work within 20 feet of track centerline: Provide PHL railroad flag person for the safety and protection of Contractor's personnel. The cost of required flagging services shall be provided by Contractor and included with the cost of related bid items for such Work. A specific Railroad Work Plan is required prior to any track closures or activity within 10 feet of the track centerline. No Work shall be performed, nor any piece of equipment moved within 10 feet of the railroad track centerline until Work Plan is approved by Engineer.

   b. For PHL flag persons, submit a Railroad Flagging Agreement, included in Appendix "B" of Specifications, to Engineer 21 Calendar Days in advance of any Work within 20 feet of track centerline.

3. Contractor shall request a "Conditional Work Window" or "Absolute Work Window" directly from PHL.

   a. Conditional Work Windows: A Conditional Work Window is a period of time Contractor is allowed to work on or near the railroad tracks but the tracks remain fully operational as defined by California Public Utilities Commission (CPUC) and FRA. When trains are approaching, Contractor shall clear the tracks. No construction equipment, personnel, or materials may be present within 10 feet of the tracks or as directed by the railroad flag person. Construction activity shall cease within 20 feet of the tracks. Conditional Work Windows shall be approved by PHL 48 hours before Work commences.

      1) Construction activities requiring a Conditional Work Window shall be clearly identified on the construction schedule as activities requiring a Conditional Work Window. Any modifications to these work windows shall be identified and submitted to Engineer and PHL in writing a minimum of 30 Calendar Days prior to any proposed changes.

b. Absolute Work Window: An Absolute Work Window is a period of time during which construction activities are given priority over railroad operations because required construction makes the track non-operable. At the end of an Absolute Work Window, the railroad tracks and signals shall be completely restored for train operations. Comply with CPUC and FRA requirements, codes, and regulations for operational tracks. PHL or its agent shall perform inspections of Work prior to placing the track back into service.

1) Submit a detailed schedule of Work to be accomplished and a list of items to be installed during an Absolute Work Window. Upon approval of Engineer that Absolute Work Window is required, that Work can be accomplished in the time requested and that the necessary materials are at Project Site, Contractor shall request an Absolute Work Window from PHL. Allow a minimum of 14 Calendar Days to arrange Absolute Work Windows with PHL and consider whether Absolute Work Window may be on the weekend or at night. Allow minimum 48 hours after PHL's approval of Absolute Work Window before commencing Work and rendering track non-operable.

2) Submit to Engineer copy of PHL’s agreement to provide a railroad flag person for the item of Work and PHL’s notification that the railroad track shall be out of service.

4. Crossing of tracks by Contractor’s equipment other than at public or designated private road crossings is prohibited without specific authorization by Engineer.

5. Immediately report any accidents, injuries, track defects, or any unusual track conditions, which may affect the safe and efficient operation of the railroad to Engineer.

6. Protect railroad facilities, equipment, and operating trains from damage due to Contractor’s activities. In the event Contractor damages railroad facilities or equipment, report the damage immediately to Engineer. Repair of damage caused by Contractor’s activities shall be at the sole cost and expense of Contractor and approved by PHL and Engineer.

7. Upon completion of Work, Contractor shall promptly remove materials, tools, equipment, and leave the right-of-way in a clean condition as approved by Engineer.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Computer system requirements to use an Internet-based project management system.

## 1.2 INTERNET-BASED PROJECT MANAGEMENT SYSTEM

A. Project shall use an Internet-based project management system, PMWeb, to submit and process for approval the following including, but not limited to:

1. Requests for Information (RFIs) and RFI responses.
2. Shop drawings and shop drawings responses.
3. Change Request Forms Time and Materials (T & M)
4. Contractor Daily Reports

B. Shop drawings shall also be submitted in conformance with Subsection 01000.21 of GENERAL CONDITIONS Section.

C. Department shall provide Contractor access to the system at no charge.

D. Department shall provide Contractor training on how to use the system. Contractor's personnel shall have basic working knowledge of computers (i.e., mouse operation, using a browser) to effectively learn the system during the training session.

## 1.3 USER ACCESS

A. Department shall control Contractor’s access to the system and assign user profiles to a maximum of 4 authorized Contractor personnel. User profiles shall define levels of access, determine function-based authorizations, and determine user privileges. Contractor’s access to the system shall be sufficient to perform Work required in this Section.

B. Contractor shall generate (including the use of a scanner where electronic files are not available) and send electronic files for the correspondence listed in Paragraph A of Internet-Based Project Management System Article of this Section.

C. Subcontractors and suppliers shall not be given direct access to the system. Information exchanged between Contractor, subcontractors, and suppliers shall be the responsibility of Contractor. Direct communication through the system shall only occur between Engineer and Contractor.

D. Any correspondence or information entered into the system shall become an official document and shall be included in Project file.

E. Comments made by Engineer on Contractor-submitted correspondence shall not relieve Contractor from compliance with requirements of Contract Documents.

1.4 COMPUTER SYSTEM REQUIREMENTS

A. Contractor shall have access to the Internet, using the latest version of any of the following browsers:

1. Google Chrome
2. Apple Safari
3. Microsoft Edge

1.5 CONTRACTOR RESPONSIBILITY

A. Contractor shall be responsible for maintenance of Contractor's hardware, software, and connectivity to the Internet. Department shall not be responsible for any delays associated from the use of the system including, but not limited to, hardware or software problems, slow response times, downtime periods, connection problems or loss of information. Under no circumstances shall the use of the system be grounds for a time extension or cost adjustment to Contract.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. This Section modifies Construction Schedule and Extension of Time and Compensable Delays Subsections of GENERAL CONDITIONS Section. Work includes but is not limited to:

1. Provide scheduler.

2. Prepare, submit, update, and revise Construction Schedules and reports.

3. Attend meetings.

B. This Section provides technical requirements for preparation and reporting of the construction schedule.

## 1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Include cost of the scheduler, office, materials, supplies, and other necessary expenses as a line item in the Schedule of Values for the corresponding Lump Sum Construction bid item of Bid Proposal Line Items. Include line items for Baseline Schedule, Monthly Updates, and Weekly Schedules. Monthly Updates shall have a minimum value of $15,000 per month for the duration of Project on Schedule of Values.

2. If the schedules and reports are not prepared, submitted, and updated as specified in any particular month, City shall withhold payment of the scheduling line item for that month.

## 1.3 ABBREVIATIONS AND DEFINITIONS

A. Refer to Abbreviations and Definitions Subsection of GENERAL CONDITIONS Section for definitions for Calendar Day; Changes in Work; City; Contract; Contract Documents; Contractor; Contract Time; days; Drawings; Engineer; Notice of Award; Notice to Proceed; Project; Specifications; Superintendent; and Work.

B. Abbreviations:

1. CPM: Critical path method

2. NTP: Notice to Proceed

C. Definitions:

1. Activity: A portion of Work which requires time and resources (labor, equipment, and/or material) to complete.

2. Baseline: The approved as submitted Preliminary Baseline which addresses Engineer's comments and contains corrections to previous submittals.

3. Construction Schedule(s): The detailed Activity level plans required by this Section.

4. Current Revised Baseline: The present replacement schedule for the Baseline or a previously revised Baseline, which was revised in conformance with the Schedule Revisions Article of this Section.

5. Days: Consecutive Calendar Days.

6. Milestone: A start or completion date defined or inferred by Contract or Drawings as calculated from NTP, start/end of phase, or Contract completion. The time base for Milestones shall be in conformance with GENERAL CONDITIONS Section.

7. 90-Day Schedule: Contractor's detailed activity level schedule for the first 90 Calendar Days of Contract, which addresses comments, and contains requested corrections to previous submittals.

8. Preliminary Baseline: Contractor's initially submitted detailed Activity level plan for constructing Project.

9. Weekly Schedule: A schedule showing the actual and the planned Activities, including changed Work, of the week before and the 2 weeks succeeding the date of the weekly meeting.

1.4 SUBMITTALS

A. Submit the name, qualifications, education, and experience (including references and lists of prior projects) of the scheduler, and a detailed description of the scheduling system to be used no later than 14 Calendar Days after Notice of Award.

B. Submit the documents listed in Table 1 at the end of this Section prior to the time and at the frequency required.

C. Present Weekly Schedule at each weekly meeting.

1.5 QUALITY ASSURANCE

A. Qualifications: Scheduler shall have a minimum of 5 years experience in preparing and maintaining CPM schedules and reports in Primavera P6 for projects of similar size, value, type, and nature. Scheduler shall be on Project Site full time (40 hours per week) to attend weekly meetings and to monitor, revise, and update the schedules, curves, and reports for the duration of Contract.

1.6 MEETINGS

A. Pre-Construction Scheduling Conference: Present and discuss proposed scheduling system and scheduling method, the sequence of operation, proposed Activity coding, cost, labor, and equipment loading, procedures for updating and revising schedules, and required submittals. Engineer shall schedule and conduct pre-construction scheduling conference with Contractor's project manager, Superintendent, and scheduler prior to pre-construction meeting. Activity code breakdown structure shall be discussed and agreed to at this meeting.

B. Weekly Meetings: Meet with Engineer to assess progress of Work once each week, on a day established by Engineer.

C. Preliminary Baseline Conflict Resolution Meetings: Attend meetings with Engineer, major subcontractors, and suppliers to resolve any conflicts between Preliminary Baseline and the intent of Contract. Engineer shall schedule meeting.

D. Monthly Schedule Update Meetings: On a monthly basis, meet with Engineer for the purpose of updating the schedule and reports. Schedule the meeting at least 7 Calendar Days prior to the required date for submittal of the updated schedule and reports. This meeting shall also include a discussion of schedule revisions that are proposed to be included in the monthly schedule update.

1.7 METHOD OF SCHEDULING

A. Prepare and maintain Construction Schedules, which represent the plan to complete Work within Contract Time. Construction Schedule shall provide Engineer with a basis to monitor progress of Work.

B. Use CPM and show schedule in time-scaled precedence diagramming format. Time-scale the schedules in Calendar Days from NTP. Show Milestones and Activities on the schedule.

C. Use a scheduling software and a computer hardware system commensurate with the size of Project. The scheduling software shall be Primavera P6 version 8.2 or later.

D. Float is a resource available to both parties and is not for the exclusive benefit or use of either Contractor or City. Float created during Project through the actions of either party remains for the benefit of either party unless expressly agreed in advance by both parties in writing to be for the sole benefit of one party. Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, imposed dates, and extended Activity durations are prohibited and are cause for rejection of the schedule.

E. A Baseline showing early completion of Contract shall not be accepted by City. Schedule updates showing early completion of Contract may be accepted by City. If schedule updates show early completion of Contract, the updated schedules shall show the time between early finish and Contract Time as Project float. City shall not move liquidated damages to the early completion date. City shall not pay for extended overhead for schedule changes or additional Work that does not increase Contract Time.

F. The schedule shall contain Activities for Milestones and for Contract Work, which includes Bid Item Work, Contingency Bid Item Work, and once authorized, any Allowance Bid Item Work. Work shall be broken down into Activities. Activity details shall assure the schedule provides an appropriate basis for monitoring and evaluating the progress of Work.

1. No Work activity, except submittals required to comply with Construction General Stormwater Permit and Stormwater Pollution Prevention Plan (SWPPP) Article of REGULATORY REQUIREMENTS Section, can start before Notice to Proceed unless specifically authorized in advance by Engineer.

2. No Work activity can exceed 28 Calendar Days (20 Work days) in duration unless specifically authorized in advance by Engineer.

3. Only Activity Types “Start Milestone”, "Finish Milestone”, and “Task” can be used unless specifically authorized in advance by Engineer. Level of Effort (LOE) activities may be used to summarize Work as needed to produce Summary Level Schedules for presentation purposes.

4. Time base for Activities of Contractor shall be in conformance with the GENERAL CONDITIONS Section.

5. Activities shall have both Predecessor and Successor Logic Ties that accurately represent the sequence and interdependence of activities; except the first Start Milestones which does not have predecessor ties and the last Finish Milestones which does not have successor ties.

    a. FS 0 (zero) logic ties are preferred.

    b. If SS successor logic ties are used, then there shall also be an FF or an FS logic tie in order for the backward pass to calculate correctly.

    c. If the lag values are not equal to zero (0), a written justification of each non zero lag shall be submitted with the first submittal of the Construction Schedule. (There shall be no exceptions to this requirement). Negative lags may not be used.

    d. SF – Start to Finish logic ties are not acceptable

6. Provide the following minimum information for each Activity:

    a. Identification Number: Each activity shall have a unique Activity Identification Number (P6 default allows 20 characters):

        1) The first 2 digits shall be the last 2 numbers of Project Specification Number.

        2) The remaining digits are for Contractor’s numbering sequence. Department requires that the last digit always be a zero (0) in case that the activity needs to be subdivided in the future.

    b. Description: Each Work activity shall have a unique Activity Name. This activity description shall tell:

        1) What type of Work is being performed: i.e. drive, install, excavate, and the like.

        2) What is being Worked on: i.e. piles, electrical conduit, and the like.

        3) Where Work is being performed: e.g. Bent #18-Compressed Air Building, and the like.

        4) Examples: Drive Piles - Bent #18 or Install Electrical Conduit - Compressed Air Building

c. Calendar: Two standard Global calendars shall be defined in addition to the calendars used by Contractor for their Work activities for Department and shall be named “POLA Calendar 1”, “POLA Calendar 2”.

1) "POLA Calendar 1” shall be a 365 / 366 Calendar Day calendar with a 7 day Work week and no holidays. This calendar shall be used for milestones, approval activities, and third party activities.

2) "POLA Calendar 2” shall be a 5 day per week single shift Work day calendar with holidays.

Note: The union holidays currently recognized by Department are:

New Year’s Day - 01 January

Memorial Day - Last Monday of May

Independence Day - 04 July

Labor Day - First Monday of September

Veterans Day - 11 November

Thanksgiving Day - Fourth Thursday of November

Day after Thanksgiving - Day after Thanksgiving Day

Christmas Day - 25 December

3) Contractor may, with the prior concurrence of Department, add other holidays and/or other calendars for special Work shifts such as 6 day single shift, 5 day double shift, and the like. Additional calendars shall be defined as PROJECT CALENDARS and shall be named with the 4-digit Project Specification number to associate it with the specific project to which it applies.

4) The calendars assigned in the schedule shall have consistent Work periods (i.e. 0800h to 1700h with a non-Work period from 1200h to 1300h).

d. Original Duration: The minimum unit of time is 1 day. Activities shall have a duration of no less than 1 and no more than 28 Calendar Days for on-site operations.

1) Denote Activities that require unusual shift Work, such as, 2 shift days, 6-day weeks, or so forth, by a different calendar code for each type of shift.

2) Activities of others shall be in Calendar Days.

3) Upon approval of the baseline schedule the original duration shall remain unchanged. Changes of duration shall be reflected in adjustment of remaining duration.

4) No fractional durations for activity durations, total float values, nor lags shall be allowed in the schedule.

5) No fractional dates shall be allowed in the schedule.

6) Presence of fractional durations or dates shall be cause for rejection of the schedule without additional review.

e. Code Activities and Milestones: Each activity shall have activity coding.

1) Activity code fields shall be defined as “global type” activity code fields.

a) The first 4 characters of the activity field name shall be Project Specification Number [SPEC].

b) “EPS type” activity codes shall not be used.

2) As a minimum, the following code fields shall be included:

a) [SPEC] BIDI – POLA Bid Item Number.

b) [SPEC] RESP – Responsibility – which entity: Contractor, subcontractor, supplier, Department, and the like, is responsible for the activity.

c) [SPEC] PHAS – Phases – a breakdown of Work into the following contractually definable phases:

1 General Conditions

2 General Requirements

3 Contract Work

4 Contract Close Out

d) [SPEC] AREA – Locations – a further breakdown of Phase Code into sub-Phases such as Contract Milestones, Permits / Prepare and Submit, Review and Approve, Procure and Deliver Materials / Geographical Contract Work Areas.

e) [SPEC] STEP – Steps – a further breakdown of Area Codes for Geographical Contract Work into Sub-Areas.

f) [SPEC] ITEM – Specification Section Number – POLA Specification Number for Work being performed.

g) [SPEC] CONO – Change Order Number – PCO No., CO No., or AFA No. Assign base activities the value “000”.

3) Note: Contractor’s plan for Phase, Area, and Step Codes to be utilized in the schedule as well as a Map or Drawing showing the exact location of Area and Step codes which are “geographical in nature” shall be submitted at Pre-Construction Meeting, and shall be approved by Engineer prior to Engineer’s review of the first Baseline Construction Schedule. There shall be no exceptions to this requirement unless approved in writing by Engineer.

7. Activities shall be resource and cost-loaded to generate the reports and curves specified in Construction Curves and Reports Article of this Section.

a. Any required resource-loading and cost-loading shall be performed using the "Resources” feature in Primavera P6.

b. "Expense” feature shall not be used to perform cost-loading in the schedule.

c. Contractor shall include an explanation of the cost-loading methodology and resource-loading methodology in the schedule narrative.

G. Activities shall include, but not be limited to, the following:

1. Work represented by bid items on Bid Proposal Line Items, including contingency bid items and allowance bid items shall be included after authorized by Engineer.

2. Prepare and Submit and Review and Approve Activities for required shop drawing and material samples.

3. Procure, including order, manufacture, test, and deliver critical material and major components, including material to be furnished by City as set forth in Contract.
4. Obtain permits.
5. Mobilize and move-in.
6. Construct temporary installations and support facilities.
7. Demolish and remove existing improvements.
8. Coordinate with other contractors under separate contract with City, tenants, utilities, and Work by others adjacent to Work.
9. Excavation, backfill, and other earthwork.
10. Construct other items.
11. Construct items by subcontracting.
12. Required inspections by other City departments or third parties and inspect/correct/pass.
13. Perform required tests and return results.
14. Obtain approval from and issue notices required by, regulatory agencies or other third party.
15. Correct punch list and obtain acceptance of Work, including commissioning, start-up, and testing.
16. Final clean-up and demobilize.
17. Perform Changes in Work upon issuance of directive by Engineer.
18. Activities required to complete Work comprised in Construction Schedule.

H. Show Milestones on the schedules and shall be identified, described, and coded similar to Activities.

I. Define the sequence of Work by assigning predecessor/successor logic relationships to Activities and Milestones.

J. Use the same Activity and Milestone identification numbers, descriptions, and codes in Construction Schedules.

K. Present submittals in the forms required by Table 1 at the end of this Section.

1. Export the native P6 schedule in .XER file format and submit Construction Schedule in electronic file format as specified in Paragraph 1.7C of this Section.

2. Plot Construction Schedules and curves on standard size cut paper sheets not larger than 22 inches by 34 inches. Each sheet shall have a title block on the lower right-hand corner and a timeline. Plots shall be time scaled to show a continuous flow of information from left to right. Identify the critical path clearly on each sheet.

3. Reports shall be on 8 1/2 inch by 11 inch paper.

1.8 CONSTRUCTION SCHEDULES

A. Prepare Construction Schedules as detailed in Method of Scheduling Article of this Section and as detailed in this Article.

1. Schedules shall be calculated using “Schedule Options” which is found in Primavera P6 under Tools – Schedule - Options:

a. Ignore relationships to and from other projects - On

b. Automatic scheduling and leveling - Off

c. When scheduling activities apply - Retained logic

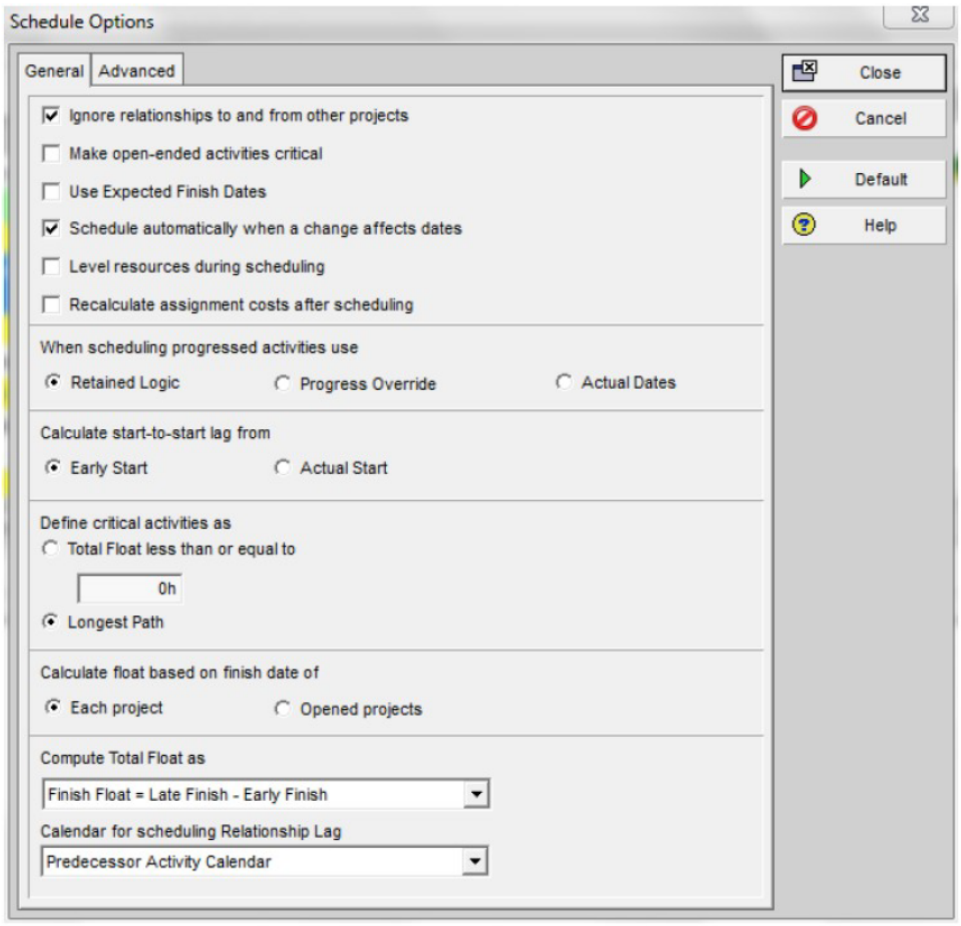
d. Calculate start to start lag from - Early start

e. Schedule interruptions - Interruptible

f. Show open ends as - Non critical

g. Calculate total float as - Finish float

P6 Schedule Options shall be set as follows:




2. Calculate/plot Critical Paths using “Longest Path Option” which is found under Tools – Schedule… [F9] - Options – Define critical activities as Longest Path (click on the radial button).

3. Data Date for Monthly Updates of Construction Schedule shall be the first Calendar Day of the following month (i.e. the Data Date of the July Update shall be 01 August). Note: When statusing Prepare and Submit, Review and Approve, or Procure Activities in Monthly Updates, add Submittal Number to Activity Description.

4. Construction Schedules (Baseline, Monthly Updates, Recovery, and the like) submitted shall have a unique four character Project ID. The first 2 characters shall be the last 2 digits of Project Specification Number. The last 2 characters can be either numbers or letters, but the schedules shall "sort" in the order in which they are submitted, with no duplication of names. Department suggests that the numbering start with SNA1. (SN=Spec No.) For example, if Project Specification Number is 2711, then Project ID would start with 11.

5. Construction Schedule submittals (Baseline, Monthly Update, Revision, Recovery, and the like) shall have a unique PROJECT NAME that includes the project title and a clear description of the schedule version (e.g.: May 2012-2 [2nd submittal of the May Update].) Note: When assigning baselines for schedule comparison, only Project name is available to identify which version is assigned.

6. Default P6 system settings may be used with the following provisions:

    a. Admin Preferences (found under Admin – Admin Preferences) – Earned Value settings shall reflect:

        1) Technique for computing performance percent complete as Activity percent Complete.

        2) Technique for computing Estimate to Complete (ETC) as ETC= remaining cost for activity.

        3) Earned Value Calculation – When calculating earned value from a baseline use Budgeted values with current dates.

    b. Financial Periods (found under Admin – Financial Periods) for Department are defined as monthly with the 1st as the start of a period and the last day of the month as the end. For stored period performance the project data date shall be indicated as the date on which to store data.

    c. User Preferences, (found under EDIT – User Preferences) - Resource Analysis shall reflect:

        1) Time Distributed Data shall be displayed based on Remaining Early Dates.

        2) Interval for time distributed resource calculations shall be Month or Week as approved by Engineer.

7. Export P6 Data to provide backup files for submittal. Each schedule submittal shall include:

    a. The data backup exported in either Primavera PM / MM – (XER) (version 8.2 or later) or Primavera PM – (XML) file format.

    b. Schedule layout definition files exported from Open Layout (found under View – Layout – Open Layout) files shall be named “layout_name.PLF”.

    c. If layouts are based on specific project data filters, ensure applicable filters are saved as a layout prior to exporting Project for transfer.

    d. Layouts may be defined as either “all users” or “project layouts”.

8. Schedule report definition files used to create submitted reports as exported from Reports (found under Tools – Reports – Reports) files are named “report_name.ERP”. [Remember to save any included filters as layouts prior to exporting the report definition file].

B. Weekly Schedule shall be in bar chart format, or any other format that is acceptable to Engineer. For the report period, show the actual start and finish dates for completed Activities, the actual start date and remaining duration of Activities in progress and the forecast start date and original duration for planned Activities. Show the percent complete of Activities. Activities may be subdivided in Weekly Schedule to more accurately monitor progress. Each activity in Weekly Schedule shall have a reference to an activity in approved Baseline Schedule. Weekly Schedule shall detail construction activities to be performed during the 1 week immediately before, and the 2 weeks immediately following the weekly construction progress meeting date. Weekly Schedule shall also include the major long lead procurement and submittal activities.

C. 90-Day Schedule shall show Activities forecasted to occur within the first 90 Calendar Days of Contract, and any Activity that shall or may affect completion dates. These Activities include, but are not limited to planning, mobilizing, submitting key shop drawings and samples, fabricating and delivering key and long-lead procurement elements. In addition, identify and show Activities that shall or may affect, or be affected by, activities of City, other City contractors, utilities, tenants, and/or other third parties. Activities and logic of 90-Day Schedule shall be the basis of the first 90 days of Preliminary Baseline.

D. Baseline Schedule shall show Activities included in 90-Day Schedule as well as Activities required to complete Work.

E. The monthly update shall be a statused submittal of 90 Day Schedule, Baseline, Current Revised Baseline, or the last approved update. The data date shall be the first day of the month following the month of the update. The information supplied in Weekly Schedule or other approved sources, shall be the basis of the actual start and finish dates or remaining duration of Activities, that were worked on or completed during the month.

1. Contractor's project manager, scheduler, and representatives of major subcontractors shall jointly review and approve the schedules, updates, and computer tabulations for accuracy prior to submittal.

2. Submit the as-built update prior to submittal of the affidavit of completion but after correction of punch list items and final cleanup. Show actual start and finish dates for Activities. Submittal of the as-built update is a condition precedent to acceptance of Work by City.

3. Engineer shall review and respond to the schedule portion of the update within 14 Calendar Days of receipt.

F. The submittal of schedules defined in Paragraphs A, B, and C of this Article, shall include a statement signed by the approved scheduler certifying that scheduler has prepared and reviewed the schedules to ensure conformance with the requirements of this Section.

1.9 CONSTRUCTION CURVES AND REPORTS

A. Cash Flow Curves:

1. Baseline cash flow curve shall show an early start/finish and late start/finish envelope of expected progress payments over Contract Time.

2. The updated cash flow curve shall show accruals from the approved progress payments and forecasted progress payments. The total of approved progress payments and forecasted progress payments shall equal the contractual bid amounts plus approved Changes in Work. Plot updated curve against Baseline or Current Revised Baseline cash flow envelope.

B. Construction Equipment Report:

1. Baseline construction equipment report shall show dates when key equipment is required on the site to accomplish Work in Contract Time. This report shall list the quantity of equipment by type and capacity (excluding small tools) in a bar chart form.

2. The updated construction equipment report shall show the actual equipment on-site during the reporting period and forecast the equipment requirements necessary to achieve Baseline or Current Revised Baseline.

C. Manufactured Item Status Report:

1. Baseline manufactured item status report shall show the required and planned delivery dates of manufactured items required by Contract. Group materials to identify requirements by Specification section and by phases. Data in this report shall include but not be limited to:

a. Activity number and description of the item.

b. Total quantity required.

c. Submittal date.

d. Review period.

e. Forecast order date.

f. Manufacturer's lead time (Receipt of order to delivery of equipment).

g. Required delivery date.

2. The updated manufactured item status report shall show actual delivery dates, and the delivery dates necessary to achieve Baseline or Current Revised Baseline.

D. Labor Curves:

1. Baseline labor curves shall show early start/finish and late start/finish labor curve envelopes for each craft showing labor requirements per calendar week over Contract Time. Plot each curve against Contract Time for each phase of Project.

2. The updated labor curves shall show the actual labor employed and forecast the labor requirements necessary to achieve Baseline or Current Revised Baseline. Plot updated curves against Baseline or Current Revised Baseline for each phase of Project.

E. Narrative Report:

1. Narrative report shall describe differences between Baseline or Current Revised Baseline, or previous month's update as approved, and the current update including reasons for the differences. Include an explanation of potential delays and/or problems, estimated impact on performance and the overall Project completion date, and planned corrective action.

F. Variance Report:

1. Variance report shall compare Baseline, Current Revised Baseline, or most recently approved update with the current update, and shall list Activities, which have been delayed 20 or more working days, and Activities with 10 days or less total float which have incurred any delay. The report shall include:

a. Activity identification number and description.

b. Early start/finish dates shown on Baseline or Current Revised Baseline.

c. Current early start/finish dates.

d. Working days remaining to complete Activity.

e. Percent completion of Activity.

f. Reason for the delay in "Remarks" column.

1.10 SCHEDULE REVISIONS

A. Revisions to the schedule may become necessary when:

1. Conditions such as weather, material availability, labor availability, field conditions, Engineer direction, or other factors differ from the conditions assumed in the schedule;

2. Changes in Work occur; or

3. Progress falls behind schedule for reasons attributable to Contractor.

B. When necessary, make revisions as provided in this Article in lieu of the provisions in GENERAL CONDITIONS Section. Request time extensions in conformance with Contract Time Extensions Article of this Section.

C. Schedule Revisions may be included in the monthly schedule update submittals. The changes shall be consistent with the changes discussed at Monthly Schedule Update Meetings, referenced in Paragraph 1.6D of this Section. Provide a written narrative that lists the changes to the schedule update along with an explanation of the changes made in the schedule update, such as:

1. Justification for the revision,

2. Evidence supporting such revision as allowable, and

3. A detailed precedence analysis schedule report of Activities changed or affected by the proposed revision.

D. Provide a detailed precedence analysis for Activities changed or affected when Engineer directs a schedule revision.

E. Contractor initiated schedule revision shall not increase the original or current Contract Time.

F. When the request is approved by Engineer, reflect the changes in the most recently approved schedule update which shall become Current Revised Baseline.

1.11 CONTRACT TIME EXTENSIONS

A. Request time extensions in conformance with Extensions of Time and Compensable Delays Subsection of GENERAL CONDITIONS Section by submitting:

1. A notice of delay or request of an extension of time shall be submitted to Engineer within the time stipulated in Extension of Time and Compensable Delays Subsection, Paragraph i of GENERAL CONDITIONS Section;

2. A time impact analysis reporting the cause of and responsibility for the delay; and

3. A detailed precedence analysis schedule report of the fragnet quantifying the delay.

B. A fragnet is a sequence of new and/or revised Activities and logic that ties a delay into the construction sequence, and mathematically demonstrates the impact of the delay on the end date of Work.

C. If the time impact analysis and fragnet are approved, the fragnet shall be analyzed as follows:

1. If approved before or while the delay is occurring, the fragnet shall be analyzed in the approved monthly update of the month before the time impact analysis was approved.

2. If approved after the delay is complete, analyze the fragnet in the approved monthly update of the month before the delay was completed.

D. Insert the approved fragnet in the update defined above and succeeding updates to and including the current monthly update. The modified schedule shall become Current Revised Baseline.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

Table 1
Submittal and Frequency Due Date

| Submittal Name | Form of Submittal | Submittal Due | Frequency |
|---|---|---|---|
| 1. Scheduler and Scheduling System | Written Report | 14 Calendar Days (CD) after Notice of Award | Until approved |
| 2. 90-Day Schedule | Electronic | 21 CD after NTP | Until approved and monthly thereafter until Baseline approved* |
| 3. Preliminary Baseline Schedule | Electronic | 45 CD after NTP | Once until approved* |
| 4. Baseline<br>a. Schedule | a. Plot and electronic | 7 CD after acceptance of | Once until approved* |

| | | | |
|---|---|---|---|
| b. Cash Flow Curves<br>c. Progress Curves<br>d. Construction Equipment Report<br>e. Manufactured Items Status Report<br>f. Labor Curves<br>g. Narrative Report<br>h. Variance Report | b. Plot<br>c. Plot<br>d. Written Report<br>e. Written Report<br>f. Plot<br>g. Written Report<br>h. Electronic | Preliminary Baseline | |
| 5. Monthly Updates/ Schedule Revisions<br>a. Schedule<br>b. Cash Flow Curves<br>c. Progress Curves<br>d. Construction Equipment Report<br>e. Manufactured Item Status Report<br>f. Labor Curves<br>g. Narrative Report<br>h. Variance Report | a. Plot and electronic<br>b. Plot<br>c. Plot<br>d. Written Report<br>e. Written Report<br>f. Plot<br>g. Written Report<br>h. Electronic | 7 CD after the end of the update month | Monthly after Baseline established* |
| 6. Weekly Schedules | Bar Chart | At weekly meeting | Weekly* |
| 7. Time Impact Analysis | Plot and electronic [supporting evidence, precedence analysis] | 14 CD after approval of request or direction | As needed* |
| 8. As-built Update Schedule | Plot and electronic | After Work is completed and prior to Project closeout | Once until approved* |
| 9. Resubmittal of rejected submittal | Plot and electronic | 7 CD after receipt of comments | As needed* |

*Resubmit rejected submittals as provided in Item 9 of Table 1

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Surveying and field engineering Work needed for Project under the direction of the professional land surveyor or registered Civil Engineer licensed to practice surveying in State of California.

B. Survey Work scope in this Section supersedes Work scope in Survey and Staking Subsection of GENERAL CONDITIONS Section.

C. Work under this Section includes, but is not limited to the following:

1. Establish and maintain horizontal and vertical control points from Engineer-supplied benchmarks and control points.

2. Layout of Improvements:

a. Control and staking for earthwork, paving, cold planing, roadway, and curb and gutter required on Project.

b. Control and staking for sewer, water, storm drain, electrical, communications, gas, and other improvements.

c. Control and survey for pile driving.

1) Survey for pile driving, including locating pile positions and orientation before and immediately after driving, location recheck after driving adjacent piles, and after placement within staylath.

2) Control and survey for cutoff or buildup of concrete piles and record of broken piles.

d. Control and staking for building corners.

e. Control and staking for chain link fences, block walls, K-rail, and striping.

f. Additional construction staking for other improvements with specific coordinates or stationing shown on Drawings.

g. Surveys for progress payments.

h. Maintain as-constructed coordinates of improvements that were surveyed during course of Project.

1.2 WORK TO BE PERFORMED BY ENGINEER

A. Engineer shall provide permanent benchmarks and main horizontal control as established by Department. Contractor shall establish temporary horizontal control points and benchmarks as necessary for Work. Engineer shall periodically check and re-establish permanent control points, but shall not be responsible for protection or ongoing maintenance of temporary benchmarks and control points.

B. Engineer may conduct topographic and other surveys of Project Site conditions at selected areas of Project prior to construction to establish a basis for subsequent quantity surveys for payment and acceptance.

1.3 PRICE AND PAYMENT PROCEDURES

A. Payment for surveying and field engineering shall be considered incidental to construction of applicable items on Bid Proposal Line Items. No separate payment shall be made.

1.4 SUBMITTALS

A. Survey submittals shall be identified as to time, area, and reason (e.g. progress survey for quarry run placement) and name of survey party.

B. Submittals shall be stamped and signed by a State of California-licensed professional land surveyor or a registered Civil Engineer licensed to practice surveying in State of California.

C. Submit drawings in current version of AutoCAD of substructure alignments showing as-built bearings, distances, elevations, and curve data for conduits and pipe alignments and as-built coordinates of vaults, pedestals, and other improvements.

1. Alignments in AutoCAD drawings shall be based on survey of substructures prior to backfill.

2. Refer to PROJECT RECORD DOCUMENTS Section for additional requirements.

D. Submit scaled AutoCAD drawings of above-ground and marine structure improvements entered on record documents job set in conformance with PROJECT RECORD DOCUMENTS Section where improvements were not constructed according to Drawings. Include as-built coordinates, bearings, distances, curve data, and other relevant survey data.

E. Submit grade sheets for roadway, curbs, gutters, headers, sewers, storm drains, and water lines.

F. Comply with requirements of CONSTRUCTION SCHEDULES Section.

G. Comply with requirements of REGULATORY REQUIREMENTS Section.

1.5 QUALITY ASSURANCE

A. Maintain at Project Site a complete and accurate log of control and Survey Work as it progresses and make log available for Engineer's review.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 SITE VERIFICATION OF CONDITIONS

A. Verify accuracy of survey control points prior to starting any Work on Project Site.

B. Notify Engineer of any discrepancies discovered.

3.2 SURVEYS AND RECORDS

A. Quantity Surveys:

1. Perform surveys for Engineer's progress payment requests and make computations based on these surveys and on topographic or other surveys performed by Engineer. Perform survey under direction of Engineer, unless Engineer waives this requirement in writing.

B. Layout of Improvements:

1. Lay out improvements from Drawings based on Engineer's established control points and benchmarks.

2. Furnish, at Contractor's expense, stakes, templates, platforms, lighting, equipment, range markers, and labor as may be required to lay out any part of improvements.

3. Lay out improvements to lines and grades established on Drawings.

3.3 SURVEY PROCEDURES

A. Verify original grid system used by Engineer for setting up benchmarks and job control points and continue to use that system in surveying Work.

B. Verify alignments and elevations shown on Drawings, in relation to Engineer's benchmarks and control before proceeding with layout of improvements.

C. Record deviations from design alignments of both constructed improvements and existing utilities exposed during construction and advise Engineer promptly upon detection of deviations exceeding tolerances identified in applicable Sections of Specifications. Record deviations which are accepted by Engineer (not corrected) on scaled AutoCAD drawings.

D. Staking:

1. Stake the following improvements, including but not limited to:

a. Set finish grade stakes at a maximum of 50-foot intervals for dirt subgrade, 25-foot intervals for base course and at grade breaks.

b. Set paving grades for each lift at 25-foot intervals and at widths of paving machine to be used, and at grade breaks. Set grades for cold planing similarly for each pass of cold planing machine at 25-foot intervals and at widths of machine to be used, and at grade breaks.

c. Set curb and gutter and roadway stakes at 25 feet on center and at horizontal and vertical curves.

d. Set sewer and storm drain grade stakes at 25-foot intervals, at maintenance holes and junction structures, and at curves.

e. Set water, electrical and communications, and gas stakes at 50-foot intervals and at angle points and curves.

f. Railroad Staking:

1) Set ballast and subballast stake spacing at 50-foot intervals.

2) Set railroad alignment stakes at 10-foot intervals for spiral curves, 25-foot intervals for short radius curves, 50-foot intervals for flat curves and 50-foot intervals for tangents and straight track.

g. Set stakes at 50-foot intervals for rock dike and dirt slope grading and at 25-foot intervals for rock placement in areas above maximum elevation shown on Drawings and stated in Specifications for Dredging Work.

h. Set building corner stakes on building line, 5 feet off of building corners, one stake per corner.

i. Stake chain link fences, block walls, and permanent K-rail at 50-foot intervals.

1) Stake also end points, angle points, grade breaks, block wall top-of-footing elevations, step-downs in block wall top-of-footings, gates, curve data, and other design improvements associated with fencing shown on Drawings.

j. Survey corners, angle points, and other coordinates and stations of wharf, dolphins, trestles, catwalks, and other marine structure construction from design coordinates and stations shown on Drawings. Survey also locations of bollards, stow pins, fenders, crane rails, embeds, and other marine structure improvements from design coordinates and stations shown on Drawings.

k. Stake striping at end points of lines and at 50 feet on center on line, at angle points, and at curves.

## 3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Furnish upon Inspector's request, use of fully equipped survey personnel, equipment, and materials as may be necessary to inspect Work and verify quantities.

2. Engineer reserves right to check accuracy of survey measurements and calculations.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Photographic documentation via an Internet-based interface through a managed service.

## 1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Photographic Documentation bid item of Bid Proposal Line Items.

## 1.3 SUBMITTALS

A. Camera Specifications: Provide specifications on the camera, lens, enclosure, power source, Internet connection, web interface, and software.

# PART 2 - PRODUCTS

## 2.1 SYSTEM REQUIREMENTS

A. The indoor/outdoor camera system shall consist of a tamper and impact resistant enclosure with integrated camera, wiper, and weather resistant powder coated aluminum housing to be mounted on a fixed pole.

B. The camera shall take high-resolution 18 megapixel digital images every 15 minutes.

C. The camera shall upload images over a wireless cellular modem, or an RJ-45 hardwired connection to a digital subscriber line (DSL) or cable modem.

D. The content shall be sent to a secure, password-protected website with an interface and online software features provided by the vendor as a managed service.

E. The system shall operate on 120 volts alternating current (VAC) or by solar power provided by the vendor with sufficient battery capacity to operate 24 hours per day.

2.2 EQUIPMENT

A. Camera: Integrated 18 megapixel, high-definition camera and lens assembly consisting of a camera with a remotely controlled focal length lens with the following features:

1. Minimum Resolution: 5184 times 3456 pixels equals 18 megapixels.

2. Lens: Adjustable optical zoom. Digital zoom shall not be used to produce original images.

3. Compression: Joint Photographic Experts Group (JPEG).

4. IP Addressing: Dynamic or Static.

5. Auto Features: Focus, ISO light sensitivity, shutter speed, and white balance.

B. Camera Enclosure: Powder coated aluminum and weather resistant housing, with the following features:

1. Anti-fog lens or thermostatically controlled heater and blower.

2. Impact resistant viewing window.

3. Minimum IP66 weather rating.

C. Quantity of Cameras: 2

D. Data Connection: Provide 1 of the following:

1. Via built-in cellular data connection provided and maintained by the system vendor.

2. Via an RJ-45 Ethernet data connection over broadband or satellite Internet access provided and maintained by Contractor.

2.3 INTERFACE AND ONLINE SOFTWARE

A. Remote Access: Contractor’s system vendor shall provide an Internet based interface and online software as a managed service, to allow the viewing of high-definition digital still images captured and stored, from any location with Internet access via a secure password protected website.

1. Maintain images on the system vendor’s website for reference available continually during the life of Project and for not less than 60 days after completion and acceptance of Project by Department.

B. Online Interface Features:

1. Software delivered by vendor as a managed service.
2. Displays company logo and project name.
3. Calendar based navigation system for selecting specific images.
4. Multifunction image browsing.
5. Pan, tilt and zoom control capability within a high-definition image.
6. A multi-view screen to view the cameras on a project at the same time.
7. Share Image Tools: Save, print, and email.
8. Display image and camera location on a map and satellite view.
9. Time lapse features including instant time lapse play back.
10. Images are the copyright of Department and protected on secure servers owned and operated by the system vendor.
11. At the completion of Project, provide Engineer a time lapse video of Project using at least 1 image per day of the entire Project. The video shall either be saved on a portable universal serial bus (USB) hard drive, which shall become property of Department, or transmitted via a secure file transfer protocol (FTP) site.
12. At the completion of Project, provide Engineer still images taken of Project in the original high resolution digital JPEG format. The images shall either be saved on a portable USB hard drive, which shall become property of Department, or transmitted via a secure FTP site. Provide the date and time each photograph was taken in file metadata.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General:

1. Mount cameras on existing high mast light poles in an operating terminal or nearby location, as directed by Engineer.
2. Install camera system in conformance with manufacturer's printed instructions, State of California and City of Los Angeles codes and requirements.

3. Install units plumb and level and at proper angle to provide maximum field of view of on-site operations.

4. Securely and rigidly anchor products in place.

5. Connect cameras to power.

B. Position camera so that field of view covers intended area of Project Site.

1. Install camera at elevation that shall provide uncompromised visual coverage, as approved by Engineer.

2. Install camera so that position of sun or manmade light sources shall not come into direct contact with field of view of camera at any time during construction.

## 3.2 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show Work. Photographs with blurry or out-of-focus areas shall not be accepted.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.

## 3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Preinstallation Testing: Test camera on-site at ground level prior to mounting unit in its intended elevated position.

a. Contact system vendor not less than 24 hours in advance of installation for testing.

b. Connect unit.

c. After 30 minutes, contact system vendor and require system vendor to remotely confirm that camera is operating properly.

d. Install cameras in approved locations.

3.4 ADJUSTING

A. Engage a factory authorized service representative to instruct Contractor's personnel on procedures to adjust camera equipment and methods of determining optimum alignment and adjustment of components.

3.5 MAINTENANCE

A. Maintain camera equipment in good operating condition on a 24-hour basis until removal.

B. Ensure lens and enclosure clarity and photo quality on a 24 hour basis.

C. Clean installed items using methods and materials in conformance with the manufacturer's written instructions.

D. Clean camera system components including camera housing windows, lenses, and monitor screens.

E. Engage a factory authorized service representative to instruct Contractor's personnel on procedures and schedules for troubleshooting and maintaining equipment.

3.6 TERMINATION AND REMOVAL

A. Removal of Camera System:

1. Upon completion and acceptance of Project by Department, and upon written notification, Contractor shall terminate and remove cameras including associated appurtenances and mounting equipment.

2. Upon removal, cameras, associated appurtenances and mounting equipment shall become property of Contractor and shall be removed off Department property.

B. Leave area clean; repair and return to original condition existing improvements damaged by the installation of cameras.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Panoramic photographic documentation, over a wide angle of view using multiple images, via an Internet based interface through a managed service.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Photographic Documentation bid item of Bid Proposal Line Items.

1.3 SUBMITTALS

A. Camera Specifications: Provide specifications on the camera, lens, enclosure, power source, Internet connection, web interface and software.

PART 2 - PRODUCTS

2.1 SYSTEM REQUIREMENTS

A. The indoor/outdoor camera system shall consist of a tamper and impact resistant enclosure with integrated camera, wiper, and weather resistant, powder coated, aluminum housing, mounted on a fixed pole.

B. The camera shall take 1 high-resolution digital image every 15 minutes.

C. The camera shall upload images over a wireless cellular modem or an RJ-45 hardwired connection to a digital subscriber line (DSL) or cable modem.

D. The content shall be sent to a secure, password protected website with an interface and online software features provided by the vendor as a managed service.

E. The system shall operate on 120 volts alternating current (VAC) or solar power provided by the vendor, with sufficient battery capacity to operate 24 hours per day.

2.2 EQUIPMENT

A. Camera: Integrated 18 megapixel high-definition camera and lens assembly consisting of a camera with a remotely controlled focal length lens with the following features:

1. Minimum Resolution: 5184 times 3456 pixels equals 18 megapixels for each frame.

2. Lens: Adjustable optical zoom. Digital zoom shall not be used to produce original images.

3. Compression: Joint Photographic Experts Group (JPEG).

4. IP Addressing: Dynamic or Static.

5. Auto Features: Focus, ISO light sensitivity, shutter speed, and white balance.

B. Camera Enclosure: Powder coated aluminum and weather resistant housing and the following features:

1. Anti-fog lens or thermostatically controlled heater and blower.

2. Impact resistant viewing window.

3. Minimum IP66 weather rating.

C. Pan and Tilt Robotic Base: Outdoor pan/tilt with the following features:

1. Pan Range: 270 degrees continuous pan.

2. Tilt Range: Plus 30 degrees to minus 90 degrees from level.

D. Quantity of Cameras: 4

E. Data Connection:

1. Provide 1 of the following:

a. Via built-in cellular data connection provided and maintained by the system vendor.

b. Via an RJ-45 Ethernet data connection over broadband or satellite Internet access provided and maintained by Contractor.

2.3 INTERFACE AND ONLINE SOFTWARE

A. Remote Access: Contractor's system vendor shall provide an Internet based interface and online software as a managed service, to allow the viewing of high-definition digital still images captured and stored, from any location with Internet access via a secure password protected website.

1. Maintain images on the system vendor's website for reference available continually during the life of Project and for not less than 60 days after completion and acceptance of Project by Department.

B. Online Interface Features:

1. Software delivered by vendor as a managed service.

2. Displays company logo and project name.

3. Create high-definition panoramic images using multiple images seamlessly stitched together.

4. Calendar based navigation system for selecting specific images.

5. Multifunction image browsing.

6. Pan, tilt, and zoom control capability within a high-definition image.

7. A multiview screen to view every camera on Project at the same time.

8. Share image tools, including save, print, and email.

9. Time lapse features including instant time lapse play back.

10. Images are the copyright of Department and protected on secure servers owned and operated by the system vendor.

11. At the completion of Project, provide to Engineer a time lapse video of Project using at least 1 image per day of the entire Project. The video shall be either saved on a portable USB hard drive, which shall become property of Department, or transmitted via a secure FTP site.

12. At the completion of Project, provide to Engineer still images taken of Project in their original high resolution digital JPEG format. The images shall be either saved on a portable universal serial bus (USB) hard drive, which shall also become property of Department, or transmitted via a secure file transfer protocol (FTP) site. Provide the date and time each photograph was taken in file metadata.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

A. General:

1. Mount cameras on existing high mast light poles in an operating terminal or nearby location, as directed by Engineer.

2. Install camera system in conformance with manufacturer's written instructions, State of California and City of Los Angeles codes and requirements.

3. Install units plumb and level and at proper angle to provide maximum field of view of on-site operations.

4. Securely and rigidly anchor products in place.

5. Connect cameras to power as directed by Engineer.

B. Position camera so that field covers intended area of Project Site.

1. Install camera at elevation that shall provide uncompromised visual coverage.

2. Install camera so that position of sun or manmade light sources shall not come into direct contact with field of view of camera at any time during construction.

### 3.2 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show Work. Photographs with blurry or out-of-focus areas shall not be accepted.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.

C. Time-lapse Video: For each on-site camera, submit electronically a time-lapse video created from stitching together the digital images for the entire Project duration.

## 3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Pre-installation Testing: Test camera on-site at ground level prior to mounting unit in its intended elevated position.

    a. Contact system vendor not less than 24 hours in advance of installation for testing.

    b. Connect unit.

    c. After 30 minutes, contact system vendor and require system vendor to remotely confirm that camera is operating properly.

    d. Install cameras in approved locations.

## 3.4 ADJUSTING

A. Engage a factory-authorized service representative to instruct Contractor’s personnel on procedures to adjust camera equipment and methods of determining optimum alignment and adjustment of components.

## 3.5 MAINTENANCE

A. Maintain camera equipment in good operating condition on a 24-hour basis until removal.

B. Ensure lens and enclosure clarity and photo quality on a 24-hour basis.

C. Clean installed items using methods and materials in conformance with the manufacturer's written instructions.

D. Clean camera system components, including camera-housing windows, lenses, and monitor screens.

E. Engage a factory-authorized service representative to instruct Contractor’s personnel on procedures and schedules for troubleshooting and maintaining equipment.

## 3.6 TERMINATION AND REMOVAL

A. Removal of Camera System:

1. Upon completion and acceptance of Project by Department, and upon written notification, Contractor shall terminate and remove cameras including associated appurtenances and mounting equipment.

2. Upon removal, cameras, associated appurtenances, and mounting equipment shall become property of Contractor and shall be removed off Department property.

B. Leave area clean; repair and return to original condition existing improvements damaged by the installation of cameras.

END OF SECTION

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Environmental mitigation measures and requirements during construction of Project.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Show cost of the mitigation monitor, technical specialists, office, materials, supplies, and other necessary expenses as a line item on the schedule of values for the corresponding Lump Sum Construction bid items of Bid Proposal Line Items.

2. Include a line item for monthly mitigation measure compliance documentation on the schedule of values for the corresponding Lump Sum Construction bid items of Bid Proposal Line Items.

1.3 REFERENCES

A. 40 CFR 761 - Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, And Use Prohibitions.

1.4 SUBMITTALS

A. Submit to Engineer an Environmental Compliance Plan (ECP) 3 weeks prior to start of construction. Plan shall contain information showing how Contractor shall achieve compliance with each mitigation measure in this Section. Compliance forms for the mitigation measures applicable to Project are included as Appendix “C” of Specifications.

1. Submit completed mitigation monitoring and reporting forms prior to the start of construction and at the end of construction.

2. Submit backup documentation monthly demonstrating compliance with the mitigation measures as applicable and, in particular, as indicated in Environmental Compliance Tracking (ECT) Form (refer to sample form in Appendix "D" and fill in form in PMWeb), including California Air Resources Board Executive Order, Engine Model Summary Template, vehicle registration card, photos of equipment with equipment identification number, and the like; and monitoring logs and reports.

B. Submit qualifications of mitigation monitor and technical specialists as specified in this Section.

C. Submit pre-construction survey for nesting birds to Engineer as required by Protection of Nesting Birds Article of this Section.

1.5 PROJECT ENVIRONMENTAL REQUIREMENTS

A. Comply with the mitigation measure requirements outlined in Appendix "C" of Specifications throughout the construction of Project.

B. Contractor shall provide and pay for the services of a qualified mitigation monitor to implement and monitor compliance with the mitigation measures and other environmental requirements required for Project.

C. Contractor shall provide and pay for the services of technical specialists as required for Project.

1.6 MITIGATION MONITOR QUALIFICATIONS AND RESPONSIBILITIES

A. The mitigation monitor shall have the following qualifications:

1. At least 2 years of recent experience in mitigation monitoring services on large and complex construction projects, port, or marine related experience.

2. Environmental Engineering, Environmental Science or related degree, advanced degree.

3. Experience and knowledge of local/state/federal laws and regulations, including but not limited to: California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), California Air Resources Board (CARB), South Coast Air Quality Management District (SCAQMD), Los Angeles Regional Water Quality Control Board (LARWQCB), Occupational Safety and Health Administration (OSHA) regulations and Toxic Substances Control Act (TSCA)

    a. General understanding of decontamination, storage, and disposal for TSCA soil in conformance with 40 CFR 761

4. General understanding of environmental issues related to cultural resources, hazards, land use, and noise.

5. Air quality technical experience in diesel engines and emissions, including emission control devices, construction equipment, and on-road trucks.

6. Experience with hazardous materials and soil and groundwater contamination.

7. Experience with AQMD Rule 403 and Dust Control Plans.

8. Experience with Storm Water Pollution Prevention Plans (SWPPPs) and storm water Best Management Practices (BMPs).

9. Ability to understand and interpret construction documents and permit requirements (plans, specifications, schedules, and regulatory permits, and the like).

10. Demonstrated planning, organizational, and problem-solving skills.

11. Ability to prepare written reports in a clear and concise manner.

12. Ability to communicate effectively and in a professional manner with Harbor Department staff, regulatory agencies, and community groups.

B. The mitigation monitor’s responsibilities shall include but not be limited to the following:

1. Develop a compliance monitoring protocol or Environmental Compliance Plan and schedule, which addresses applicable mitigation measures and environmental requirements, throughout the duration of Project. Refer to Appendix "C" of Specifications.

2. Conduct pre-construction and regular coordination meetings to inform and train construction personnel about mitigation requirements.

3. Retain technical specialists such as qualified archaeologists, paleontologists, and biologists to provide monitoring services for specific mitigation measures, as applicable. Specialists retained shall meet the specific qualifications outlined for each specialist type.

4. Organize and complete recordkeeping and documentation for compliance with applicable mitigation measures and environmental requirements, including back-up and verification documentation to be easily accessible upon request by Engineer.

5. Document and report non-compliance issues to Engineer. Substitute of or deviation from a specified mitigation measure or environmental requirements requires approval by Engineer.

6. Resolve non-compliance issues.

7. Compile, certify, and submit monitoring verification documentation to Engineer upon Project completion.

8. Coordinate with Engineer to facilitate auditing and reporting to Harbor Department Board of Commissioners, including spot checks of compliance actions and documentation.

C. The mitigation monitor shall be on site a minimum of 20 hours per week for the duration of Contract.

1.7 TECHNICAL SPECIALIST QUALIFICATIONS

A. Archaeology:

1. The minimum professional qualifications in archaeology are a graduate degree in archaeology, or anthropology plus:

a. At least 1 year of full-time professional experience or equivalent specialized training in archaeological research, administration, or management;

b. At least 4 months of supervised field and analytic experience in general North American archaeology; and

c. At least 1 year of full-time professional experience at a supervisory level in the study of archaeological resources of the prehistoric period.

d. Demonstrated ability to carry research to completion.

e. Current membership in an archaeological organization with a code of ethics or code of conduct (e.g. Register of Professional Archaeologists, Archaeological Institute of America, Society for American Archaeology).

B. Paleontology:

1. A graduate degree, from an accredited organization, in paleontology, or related field, including geology, biology or zoology, with a specialization in paleontology;

2. At least 1 year full time professional experience, or equivalent specialized training in paleontological research (i.e., the identification of fossil deposits, application of paleontological field and laboratory procedures and techniques, and curation of fossils specimens), administration, or management;

3. At least 4 months of supervised field and analytic experience with demonstrated knowledge of Southern California paleontology and geology; and

4. Demonstrated ability to carry research to completion.

C. Historic Architecture:

1. The minimum professional qualifications in historic architecture are a professional degree in architecture and a State of California license to practice architecture, plus 1 of the following:

   a. At least 1 year of graduate study in architectural preservation, American architectural history, preservation planning; or

   b. At least 2 years of full-time professional experience on historic preservation projects.

   c. Graduate study or experience shall include detailed investigations of historic structures, preparation of historic structures research reports, and preparation of plans and specifications for preservation projects.

D. Biological and Marine Resources:

1. Bird Nest Surveys:

a. In order to perform nest surveys prior to ground-disturbing activity or clearing, removal or grubbing of vegetation, a qualified biologist shall have a master's degree or doctorate in ornithology, wildlife ecology, vertebrates field biology, or a closely related field, and who has no fewer than 5 years professional experience formally studying birds. The experience of the qualified biologist shall have been primarily in coastal Southern California, including sufficient local field experience in identification of flora or fauna, particularly rare, endangered and threatened species, with knowledge of their local and range-wide population status and trends. The qualified biologist shall also have at least 3 years experience performing nest surveys.

b. If a project includes a federal/state-listed endangered, threatened, or other special-status species, the qualified biologist shall also possess the applicable Endangered Species Act (ESA) Section 10(a)(1)(A) recovery permit. If such a recovery permit does not exist for the species of concern, the qualified biologist's previous experience shall include at least 5 years documentable experience monitoring or managing projects that include this specific species.

1.8 PROTECTION OF NESTING BIRDS

A. To comply with state and federal laws protecting nesting birds, Contractor shall conduct pre-construction surveys for nesting birds before any construction activity that disturbs vegetation, trees, or soil is performed between January 1st and September 15th. Conduct pre-construction survey 1 week prior to vegetation, tree, or soil disturbing activity.

B. Biologist shall determine during pre-construction survey if deterrents are necessary to prevent future nesting. Contractor shall install deterrents as directed by Engineer.

C. If nesting birds are detected, Contractor shall implement no-disturbance buffers until the nests have fledged. The size of the buffers shall be based on the judgment of a qualified biologist. The biologist shall determine the buffer based on the species ecology, its tolerance to disturbance, and the type of construction activity that is occurring. Periodic monitoring shall be conducted to ensure the nest is not disturbed.

D. If a potentially active nest is encountered during construction, Contractor shall immediately cease Work in the area and immediately notify Engineer of the discovery. Contractor shall not resume Work in the area until directed to do so by Engineer. When Contractor is directed to resume construction, such operations shall be conducted as directed by Engineer.

E. Applicable laws including but not limited to Federal Migratory Bird Treaty Act; California State Codes 3503 and 3503.5.

1.9 CEQA COMPLIANCE

A. Contractor shall comply with any mitigation measures, lease measures, standard conditions of approval, permit conditions and/or best management practices outlined as part of an associated CEQA assessment, when applicable.

B. Applicable laws include, but are not limited to California Public Resources Code 21000 et seq. and California Code of Regulations 15000 et seq.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Permit and fee requirements

B. Government agency notifications, fees, and license requirements required for Project

C. Submittal requirements for permits and notifications

D. Contractor shall pay costs of fines, including fines against Department, resulting from Contractor’s non-compliance with permit requirements or failure to procure appropriate permits.

1.2 CITY OF LOS ANGELES PERMITS

A. Contractor shall obtain and Department shall pay for City of Los Angeles permits required by Department of Building and Safety (LADBS), Fire Department, and Department of Public Works. Payment shall be made by an Interdepartmental Order (IDO) to these departments. Engineer shall obtain plan check unless specified otherwise.

1. City of Los Angeles Department of Building and Safety permit applicants are required to present the following prior to the issuance of permits:

a. Worker's Compensation Insurance Certificate.

b. Contractor's license.

c. City of Los Angeles Business Tax Identification Number.

2. Coordinate payment with Engineer. Permits required include but are not limited to the following:

a. Building Permit (Refer also to the Construction Stormwater Pollution Control and Construction General Stormwater Permit and Stormwater Pollution Prevention Plan (SWPPP) Articles of this Section)

b. Sewer Connection Permit

c. Plumbing Permit

d. Mechanical Permit

e. Electrical Permit

f. DWP Permit

g. CPUC Application

h. B - Permit

i. CDP and Dual Juristiction Approval

j. Non-Building Permit

B. Refer to WATER DISTRIBUTION Section for additional LADBS, City of Los Angeles Fire Department, and Los Angeles County Health Department permit requirements.

C. Obtain City of Los Angeles Department of Public Works, Bureau of Street Services Overload permit where hauled material dimensions exceed overlength, overwidth, or overheight criteria, or materials are subject to other permit requirements.

D. On-site inspection approval from Department shall be required for hot work. Secure a hot work permit for welding, cutting, burning, pitch heating, riveting, grinding, drilling, and other fire and spark producing operations from Port Police Office at (310) 732-3973 or (310) 732-3500 at 330 South Centre Street, San Pedro, California 90731 two working days prior to start of hot work. There is no fee for this permit.

1. Furnish safety devices, extinguisher, and fire watch as required by permit.

2. Exercise caution in welding and cutting operations to avoid fire.

1.3 SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD) REQUIREMENTS

A. Obtain pertinent SCAQMD permits and comply with SCAQMD rules and permit requirements, including, but not limited to, the following:

1. Submit to South Coast Air Quality Management District (SCAQMD) a notification form (SCAQMD Rule 1403) 10 working days prior to start of chemically-impacted soil cleanup or abatement order soils remediation Work. Obtain forms from the SCAQMD Enforcement Division, Toxics Section.

2. Obtain and pay for SCAQMD permits under Rules 201, 203, 222, and/or 2202 for affected classes of equipment, including but not limited to, internal combustion engines greater than 50 brake horsepower which are not used as vehicle propulsion (air compressors, generators, winch motors, and the like).

    a. California Air Resources Board permits may be obtained for eligible portable engines in lieu of SCAQMD permits.

3. Comply with City of Los Angeles Municipal Code Section 91.108.13 and SCAQMD Rule No. 403, Fugitive Dust.

    a. Contractors performing Large Operations as defined by SCAQMD Rule No. 403 shall prepare and obtain SCAQMD approval of a fugitive dust control plan prior to start of Work.

    b. Implement SCAQMD's Best Available Control (BAC) measures in Table 1 of Rule 403. Large construction projects (on a property which contains 50 acres or more of disturbed surface area) shall also follow Rule 403 Tables 2 and 3.

4. Comply with SCAQMD Rule 1166 Volatile Organic Compound Emissions from Decontamination of Soil.

5. Abrasive Blasting: Select materials and methods that comply with SCAQMD Rule 1140 Abrasive Blasting.

6. Comply with SCAQMD Rule 1466 Control of Particulate Emissions from Soils with Toxic Air Contaminants.

1.4 OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), FIRE, AND OTHER SAFETY REQUIREMENTS

A. Comply with State of California Construction Safety Orders and General Industry Safety Orders issued by Department of Industrial Relations, Division of Occupational Safety and Health; and Safety and Health Regulations for Construction administered by United States Department of Labor, Occupational Safety and Health Administration (OSHA).

B. Hazardous Substances: Also known as hazardous materials, are defined in California Health and Safety Code 25501 (n). Hazardous substances include those shown in “Director’s List” from Department of Industrial Relations pursuant to Hazardous Substances Information and Training Act, and those described in Part 172 of Title 49 of the Code of Federal Regulations (CFR), Department of Transportation Hazardous Materials List.

1. Examples of hazardous substances commonly used in construction projects include, but are not limited to, the following:

   a. Toxic materials (pesticides, herbicides, epoxies, curing compounds, and paints),

   b. Corrosive materials with pH of 2 or less (muriatic and other acids),

   c. Corrosive materials with pH of 12.5 or more (soda lye and lime),

   d. Ignitable materials (gasoline and diesel fuel, propane, and solvents),

   e. Reactive materais (chlorine), or

   f. Any other material for which a Safety Data Sheet (SDS) has been prepared.

2. Handle hazardous substances in conformance with applicable federal, state, and local regulations.

3. Make current and accurate copies of SDS available at Project Site for each hazardous substance to be used at Project Site.

   a. Train employees that handle hazardous substances and hazardous wastes in procedures for handling such materials. Refer also to Hazardous Waste Article of this Section.

4. Store hazardous substances in conformance with California Health and Safety Code and City of Los Angeles Fire Code requirements.

    a. Comply with California Health and Safety Code, Division 20, Chapter 6.95, Section 25500. Contractor shall file a Hazardous Materials Business Plan through California Environmental Reporting System (CERS) as implemented by City of Los Angeles Fire Department and associated Certified Unified Program Agency (CUPA) at http://fire.lacounty.gov/wp-content/uploads/2019/08/lacofd-CERS-User-Guide_Part3.pdf if on-site storage of hazardous substances exceeds the following quantities:

        1) Liquids: 55 gallons

        2) Solids: 55 pounds

    b. On-site storage refers to the uninterrupted presence of hazardous substances at Project Site for 30 Calendar Days or more, including refills or replacement of stock.

5. Protect hazardous substance storage containers from wind and rain. Place secondary containment beneath containers or equipment to capture drips and spills.

6. Clean up spills immediately. Place absorbent material on residue from small spills and dispose of wastes in conformance with federal, state, and local regulations and with Hazardous Waste Article of this Section. Submit spill cleanup method to Engineer upon request.

7. Depending on the extent, volume, and discharge to surface or subsurface waters from the spill, Contractor shall comply with notification and reporting requirements.

## 1.5 HAZARDOUS WASTE

A. General: Hazardous waste is defined by Health and Safety Code 25117 and, California Code of Regulations, Title 22 Division 4.5, Chapter 11 Article 2, Section 66261.10 et. Seq. Notify Engineer of observances or occurrences of hazardous waste. Comply with federal, state, and local reporting requirements. Continued Work at the affected area of Project Site shall require the approval of Engineer.

1. Prior to performing any Work in affected areas, prepare a Project Site-specific Safety and Health Program pursuant to Hazardous Waste Operations and Emergency Response (HAZWOPER) requirements in California Code of Regulations CCR Title 8 Section 5192. Upon generating hazardous waste, Contractor shall furnish Safety and Health Plan for Project Site and submit to Engineer within 2 Calendar Days of generation.

2. Workers shall be trained in conformance with CCR Title 8 Section 5192.

3. Dispose of hazardous wastes at licensed facility that is permitted to receive hazardous waste (recycling and disposal) as approved by Engineer.

4. Submit copies of documents to Engineer, including hazardous waste manifests indicating the amount, nature, and disposition of the hazardous waste within 10 Calendar Days of disposal, as required by law and regulations.

B. Pre-Existing Hazardous Wastes: City shall retain title to pre-existing hazardous waste removed from Project.

1. Store and manage hazardous wastes discovered on-site during the course of construction and resulting from construction activities in conformance with California Health and Safety Code. Protect hazardous waste storage containers from wind and rain in conformance with applicable laws and regulations. Place secondary containment beneath receptacles to capture drips and spills.

2. In handling City's materials, City acknowledges that for the purposes of Contract, it retains generator status and shall be the primary or designated generator, shall obtain the necessary United States Environmental Protection Agency (U.S. EPA) identification number, and sign the transportation manifests as owner of the material.

3. Pay fees required for the disposal of hazardous waste.

C. Contractor-Generated Hazardous Wastes: Contractor shall retain title to hazardous waste generated from supplies and equipment brought on Project Site and any Laydown Area(s).

1. Contractor shall bear costs, including disposal fees and taxes, for managing and disposing of hazardous waste generated from supplies and equipment brought on Project Site and any Laydown Area(s).

2. Contractor shall obtain their own EPA ID number for disposal of Contractor-Generated Hazardous waste.

1.6 CHEMICALLY IMPACTED SOIL AND WATER

A. Notify Engineer of observances or occurrences of soil and/or groundwater contamination. Engineer shall notify Port Police, Director of Environmental Management, and Risk Manager. Continued Work at the affected area of Project Site shall require the approval of Engineer.

B. Remove chemically impacted soil and groundwater as directed by Engineer and in conformance with applicable federal, state, and local regulations, including, but not limited to, South Coast Air Quality Management District (SCAQMD); California Environmental Protection Agency (EPA), Department of Toxic Substances Control (DTSC); State Water Resources Control Board (SWRCB); and City of Los Angeles Fire Department. Dispose of chemically impacted soil and groundwater as directed by Engineer.

C. Obtain permits for excavation and disposal of chemically impacted soil and water.

D. Refer to Hazardous Waste Article of this Section for further requirements if the contamination is determined to be hazardous.

E. For chemically-impacted soil and water, prepare a Project Site-specific Safety and Health Plan in conformance with requirements of Hazardous Waste Article of this Section.

1.7 OFF-SITE TRAFFIC REQUIREMENTS

A. Minimize interference with the existing traffic patterns on surrounding publicly traveled streets and access roads.

1. Provide traffic control barriers, lights, detours, markings, and construction signage on publicly traveled streets advising of construction in conformance with California Manual of Uniform Traffic Control Devices (California MUTCD).

a. 7 Calendar Days prior to start of construction, provide advance construction signs in accordance with City of Los Angeles Standard Plan S-791-1.

2. Route vehicles hauling materials to minimize traffic conflicts and congestion.

3. Trucks hauling dirt, sand, or gravel shall comply with SCAQMD Rule 403 Best Available Control measures and the following additional requirements:

    a. Maintain at least 6 inches of freeboard.

4. Install wheel washers where vehicles enter and exit unpaved roads onto paved roads in conformance with Construction Stormwater Pollution Control Article of this Section.

5. Stabilize the materials while loading, unloading, and transporting to reduce fugitive dust emissions.

6. Belly-dump truck seals shall be checked regularly to remove trapped rocks to prevent spillage.

7. Comply with track-out regulations in conformance with SCAQMD Rule 403, regardless of project size.

B. Rush Hour Construction Ban: Work in the public right-of-way on City of Los Angeles streets is prohibited during the morning and evening rush hours, from 6:00 a.m to 9:00 a.m. and from 3:30 p.m. to 7:00 p.m. The ban includes both actual construction on City streets as well as the staging of equipment and materials, even if construction is not in the public right-of-way.

1. Construction activities related to emergency maintenance and repair are exempted from the rush hour construction ban. Verify emergency status with Engineer.

C. Refer to SITE CONDITIONS Section for additional requirements.

1.8 CONSTRUCTION STORMWATER POLLUTION CONTROL

A. Minimum Water Quality Protection Requirements:

1. Comply with the following minimum standards of good housekeeping:

    a. Earth, construction materials, sediments, trash, construction-related wastes, other potential pollutants, or stockpiles of these materials shall not be transported by wind or blower, storm or wash water from Project Site via sheetflow, swales, area drains, natural drainage, storm drains, or streets.

b. Handle hazardous materials in conformance with Occupational Safety and Health Administration (OSHA), Fire, And Other Safety Requirements Article of this Section, and applicable federal, state, and local regulations.

c. Retain concrete wastes on-site until concrete wastes can be appropriately disposed or recycled. Accumulated concrete wastes on Project Site shall become property of Contractor and shall be recycled in conformance with Contractor's Waste Management Plan (WMP) as described in CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT Section of Specifications. On-site washout shall be allowed only in designated areas away from drains, ditches, and streets.

d. Deposit trash and construction-related solid wastes in covered and labeled receptacles. Prevent dispersal of trash by wind and prevent rainwater percolation through trash.

e. Handle and dispose of hazardous wastes in conformance with Hazardous Waste Article of this Section and applicable federal, state, and local regulations.

f. Prevent tracking of sediments and other materials from Project Site by vehicle traffic. Stabilize construction entrance roadways to inhibit sediments from being deposited into the public ways. Comply with the provisions of Housekeeping And Maintenance of Surface Areas of Project Site and any Laydown Area(s) Subsection of GENERAL CONDITIONS Section.

    1) Install Stanton Systems STB 30 Tire Wash system or Moby Dick ConLine KIT Flex 400 C at construction entrance. Washing shall be automatically triggered.

    2) Manufacturers:

        a) Stanton Systems, (215) 956-9800 or (800) 884-9281.

        b) Moby Dick, https://www.mobydick.com/en/

    3) Submit proposed manufacturer and product to be used.

g. Non stormwater runoff from equipment and vehicle washing and any other activity shall be contained at Project Site.

h. Best Management Practices (BMPs) Requirements: Installed BMPs shall be as defined by and in conformance with “California Stormwater Best Management Practices Handbook” and SWRCB. Contractor shall obtain a copy of “California Stormwater Best Management Practices Handbook”. Visit https://www.casqa.org/resources/bmp-handbooks.

i. Inspect Project Site prior to storm event predictions to ensure that BMPs are properly installed. Conduct routine Project Site inspections to ensure that Best Management Practices are adequate to prevent any debris, particulates, or fluids from leaving the lay down area and/or entering Port waters.

j. Soil and debris piles shall be underlain with 2 layers of Visqueen and shall be covered with Visqueen weighted down with sandbags. Create temporary berms around piles to prevent stormwater infiltration of storage materials. Routinely observe the water surface to look for sheen, debris or particulates from Project Site. Immediately cease Work on piles should a pollutant enter the water and notify Engineer.

B. Refer to Construction General Stormwater Permit and Stormwater Pollution Prevention Plan (SWPPP) Article of this Section for projects disturbing 1 acre or more of soil.

1.9 CONSTRUCTION GENERAL STORMWATER PERMIT AND STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. Project has 1 acre or more of disturbed soil and is subject to U.S. EPA National Pollution Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit) (CGP) Order WQ 2022-0057-DWQ NPDES No. CAS000002 adopted on September 9, 2022 and any subsequent iterations for stormwater discharges associated with construction activity. Contractor shall comply with the requirements of CGP. CGP and attachments can be found at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html

B. Project was determined by Engineer to be Risk Level 2.

C. Visual monitoring and reporting requirements shall be in conformance with Risk Level 2 included in Attachments D, D.1, and D.2 of CGP.

D. Effluent monitoring and sampling requirements shall be in conformance with Risk Level 2 included in Attachments D, D.1, and D.2 of CGP.

E. Stormwater discharges and authorized non-stormwater discharges shall not contain a hazardous substance equal to or in excess of a reportable quantity listed in 40 CFR Part 117.3 and 40 CFR 302.4.

F. Comply with Total Maximum Daily Load (TMDL) Implementation Requirements in Attachment H of CGP.

G. Submit to Engineer the names and qualifications of Qualified SWPPP Developer (QSD) and Qualified SWPPP Practitioner (QSP) within 14 Calendar Days after issuance of Notice to Proceed date.

1. QSD shall write, amend, and certify SWPPP documents.

2. QSP shall perform visual observations of discharges, field BMP inspections, perform sampling and analysis, Pre-Qualifying Precipitation Event (QPE) inspections, and train employees on BMPs.

H. Stormwater Pollution Prevention Plan:

1. Plan Description:

a. Design, submit, implement, and document Project Site-specific SWPPP plan in conformance with CGP to control stormwater pollution from sediments and construction materials leaving Project Site. For additional information on plan preparation, visit SWRCB website at www.swrcb.ca.gov. Refer also to City of Los Angeles Bureau of Sanitation, Watershed Protection Division, at www.lacitysan.org/san/faces and California Stormwater Quality Association (CASQA), "California Stormwater Best Management Practice Handbooks", telephone number (650) 366-1042. Website address: www.casqa.org.

2. Plan Requirements:

a. Prepare SWPPP as follows:

1) Supply information required by SWRCB in SWPPP and submit to Engineer, for review and approval, 30 Calendar Days prior to grading or other soil disturbing construction activities. Refer to SWPPP Requirements and Qualifying Precipitation Events (QPE) Paragraph of this Article for additional requirements.

a) Include Project Site-specific BMP layout map.

b) Failure to submit SWPPP to Engineer may be cause for withholding of payment.

b. Construction Project Site Monitoring Program:

1) Develop and implement Construction Site Monitoring Program (CSMP) as part of SWPPP in conformance with the requirements of Attachments D, D.1, and D.2 of CGP. CSMP shall be Project Site-specific and shall include monitoring procedures and instructions, pre-earthwork drawings, construction and earthwork drawings, location maps, forms, and checklists.

2) Perform required monitoring and inspections, including non-compliance reporting, conforming to Project's Risk Level. Refer to Attachments D, D.1, and D.2 of CGP.

c. Maintain a copy of the reviewed SWPPP plan at Project Site.

3. Electronically submit other Permit Registration Documents (PRDs) to Engineer, including Site Map; Project Site-specific Stormwater Pollution Prevention Plan; and Signed Certification Statement.

a. Include check payable to State Water Resources Control Board to cover fee due per project, per year of construction activity starting at Notice to Proceed. Engineer shall file the completed PRDs (including fee) with State Water Resources Control Board, per project per year of construction activity. Include in fee amount the base cost, per acre cost, and applicable surcharge. Allow Engineer at least 14 days prior to commencement of construction activities for filing PRDs and at least 7 days prior to commencement of construction activities to send the check.

b. Contact Engineer to obtain Waste Discharge Identification (WDID) number.

c. Electronic file of Notice of Intent (NOI) and listing of fees can be found at:
https://www.waterboards.ca.gov/resources/fees/water_quality/#stormwater

4. Sampling, Testing, and Action Levels:

    a. For Risk Level 2 projects, perform sampling and testing in conformance with Attachments D, D.1, and D.2 of CGP.

    b. If numeric action levels (NALs) for Risk Levels 2 or 3 are exceeded, perform Project Site evaluation, implement additional BMPs, and revise SWPPP either to prevent pollutants and authorized non-stormwater discharges from contaminating stormwater, or to substantially reduce the pollutants to levels consistently below NALs. Submit NAL exceedance report electronically to Engineer within 2 days after conclusion of the storm event for Engineer to report to SWRCB.

    c. Comply with applicable TMDL Implementation Requirements in Attachment H of CGP, including TMDL-specific additional BMPs and site pollutant modeling, numeric action levels, and numeric effluent limitations.

5. Inspection, Maintenance, and Repair:

    a. Implement and maintain the reviewed SWPPP BMPs at Project Site year-round in conformance with SWRCB requirements.

    b. Perform self-inspection of BMPs prior to and during anticipated storm events.

    c. Complete self-inspection checklists and logs required by SWRCB for each inspection and maintain at Project Site for Engineer’s review for Contract duration.

        1) Adequate checklist and log maintenance, and approval of them, shall be a condition to approval of rain delay schedule extensions.

    d. QSD and QSP shall perform on-site inspections as listed in CGP.

6. Contractor shall show Waste Discharge Identification number (WDID) to LADBS as proof of submittal of NOI whenever Contractor is required to get a permit from LADBS.

7. Refer to Attachment B of CGP for definitions of Numeric Effluent Limitation and Numeric Effluent Limitation Exceedance.

I. Qualified Precipitation Event (QPE):

1. QSP shall conduct a pre-QPE inspection within 72 hours prior to any weather pattern that forecasts having a 50 percent or greater Probability of Precipitation (PoP) of 0.5 inches or more in a 24-hour period.

2. Obtain precipitation forecast information from National Weather Service of the National Oceanic and Atmospheric Administration (NOAA) Forecast Office.

3. Submit pre-QPE to Engineer for all phases of construction.

4. Refer to Attachments D, D.1, and D.2 of CGP for additional requirements.

J. Maintain a paper or electronic copy of CGP records at Project Site. Submit records on a monthly basis to Engineer during the course of construction and, for Annual Report, prior to September 1 of each year, the collection of the year's records since September 1 of the previous year and, upon Substantial Completion of Project, remaining un-submitted records for Project. Include:

1. A summary and evaluation of sampling and analysis results, including original laboratory reports.

2. The analytical methods, method reporting units and method detection limits of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit").

3. A summary of corrective actions taken during the reporting period.

4. Identification of any compliance activities or corrective actions that were not implemented.

5. A summary of violations of CGP.

6. The individuals who performed the facility inspections, sampling, visual observation (inspections), and measurements.

7. The date, place, time of facility inspections, sampling, visual observation (inspections), and measurements including precipitation (rain gage).

8. The visual observations and sample collection exception records and reports specified in Attachments D, D.1, and D.2 of CGP.

9. Training information consisting of:

    a. Documentation of training for individuals responsible for activities associated with compliance with CGP.

    b. Documentation of training for individuals responsible for BMP installation, inspection, maintenance, and repair.

    c. Documentation of training for individuals responsible for overseeing, revising, and amending SWPPP.

10. Photographs of BMPs before, during, and after storm events.

11. Chain of custody forms.

K. Terminating Permit Coverage:

1. To file Notice of Termination (NOT), notify Engineer upon completion of construction and land disturbing activities and provide the following documents to Engineer:

    a. Completed NOT

    b. QSP-prepared final NOT inspection with QSP name and valid QSP certificate number

    c. Final Project Site-specific map

    d. Photos demonstrating final stabilization and implementation of post-construction BMPs and low impact development

L. Prohibited Discharges:

1. The following discharges are prohibited:

    a. Debris and trash, in conformance with SWRCB Resolution 2015-0019 as applicable to construction stormwater discharges including the following:

        1) Dischargers shall implement, operate, and maintain trash management, treatment, and institutional controls to eliminate debris and trash from stormwater discharges and authorized non-stormwater dischargers consistent with the prohibition of the discharge of debris and trash regulated by CGP.

b. Treatment chemicals except as authorized in Attachments F and G of CGP;

c. Wastewater from washout or cleanout of areas, structures or equipment with concrete, grout, stucco, paint, or other construction materials;

d. Form-release oils and curing compounds;

e. Fuels, oils, fluids, or other materials used in vehicle and equipment operation and maintenance;

f. Soaps, solvents, or detergents (used in vehicle equipment washing or external building wash down, and the like); and

g. Toxic or hazardous substances (asbestos, lead, mercury, or PCBs).

1.10 TREATED WOOD AND TREATED WOOD WASTE

A. Railroad ties, timber piles, timber wharf framing, and utility poles present within the facilities are considered, upon disposal, to be treated wood waste (TWW) containing creosote, pentachlorophenol, or waterborne preservative (such as Ammoniacal Copper Zinc Arsenate (ACZA)) which the State of California has determined to be potentially hazardous. Remove, manage, and dispose of TWW materials at California Regional Water Quality Control Board (CRWQCB) approved and licensed landfills in conformance with Alternative Management Standards (AMS). Contractors performing treated wood removal and TWW disposal shall have a HAZ certification from California Contractors State License Board.

1. Confirm with Engineer the latest Department of Toxic Substances Control (DTSC) requirements prior to starting demolition.

B. Submit 2 copies of the manifest from the transporter to Engineer including weight tickets.

C. Refer also to Hazardous Waste Article of this Section.

1.11 MITIGATION MONITORING AND REPORTING PROGRAM

A. Comply with the requirements of Mitigation Monitoring and Reporting Program included as Appendix “C” of Specifications. Refer to ENVIRONMENTAL CONSTRUCTION REQUIREMENTS Section for additional requirements.

1.12 FEDERAL RAILWAY ADMINISTRATION (FRA) AND PUBLIC UTILITY COMMISSION (PUC) RAILROAD SAFETY REQUIREMENTS

A. Contractor shall qualify employees to perform Work within railroad right of way as required by FRA regulations. Refer to COORDINATION Section for additional requirements.

B. Railroad flag persons for Work shall be present at all times where Work is occurring within 20 feet of the nearest railroad track. Refer to COORDINATION Section for additional requirements.

C. Clear a safe toe path to existing live railroad track after each workday in conformance with Public Utility Commission General Order No. 118.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Requirements for fully operational field offices including but not limited to furnishings, fixtures, supplies, and utilities

## 1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this section shall be paid under the Field Offices bid item of Bid Proposal Line Items.

## 1.3 COORDINATION

A. Purchase of wireless network equipment shall be coordinated with Department's Cisco Account Manager, Linda Mendoza, at (714)-478-2779 or lindmend@cisco.com. Wireless network equipment shall be added to Department's Cisco Account.

## 1.4 OFFICE REQUIREMENTS

A. Furnish and install 1 new field office, complete and functional, for the exclusive use of Department personnel at Project Site.

1. Field office shall be weather tight, secure, and lockable independently from other offices or facilities.

2. Field office provided for the duration of Project shall be new or refurbished in “As New” condition as approved by Engineer. If trailer becomes the property of Department upon completion of Project, then the trailer shall be new.

B. Procure and maintain any required permits, licenses, inspections, or approvals from City of Los Angeles, State of California, and other authorities having jurisdiction.

C. Field office shall be made fully operational at Project Site within 30 Calendar Days after Department approval of Contractor’s trailer layout plan submittal.

D. Field office provided for Department use shall be independently lockable and secure against unauthorized access from the outside.

E. Field office shall conform to the requirements of Americans with Disabilities Act (ADA) for disabled accessibility including providing ramps, handrails, railings, and accessible restrooms.

1.5 QUALITY ASSURANCE

A. The following criteria shall establish a general minimum standard of quality for items that are not expressly specified in this Section:

1. State of California Department of Housing (DOH) laws and regulations, including but not limited to, California Health and Safety Code, Division 13.

1.6 SUBMITTALS

A. Within 7 Calendar Days from Notice to Proceed (NTP), submit to Engineer the following:

1. Proposed layouts including location of ADA compliant stairs, ramp(s), and and decking, detailed shop drawings including pad, pier, and anchor details, samples, product data for furnishings, equipment, telephone backboard locations, and other items needed to provide a complete office facility.

2. Exterior paint color samples for approval prior to constructing field office.

3. Project Site maps indicating lay down, storage, and track locations.

PART 2 - PRODUCTS

2.1 SIZE AND CONSTRUCTION OF FIELD OFFICE

A. The size of the field office shall be as follows:

1. Construction Division Field Office at Project Site: 48 feet by 60 feet 6 inches or 2,904 usable square feet, with 12 office cubicles, 1 conference room, 1 men’s restroom, 1 women’s restroom, 1 kitchen area, and a copy/open area as shown on Exhibit No. 1 at the end of this Section.

B. Provide field office with a minimum of 8 feet ceiling height. Ceiling shall be suspended with acoustical tiles and fluorescent lighting. Flooring shall be vinyl floor tiles or carpet of light earth tone color as approved by Engineer.

C. Provide sliding type windows, 4 feet by 4 feet, with aluminum frame and insect screens. Windows shall have mini blinds. Walls shall be covered with wood paneling.

1. Location of windows shall be coordinated with Engineer before submitting shop drawing. Provide 1 window per office.

2. Provide security grilles on the exterior of the windows.

D. Exterior doors shall be 3’-0" by 6’-8" with glass lite and automatic closers. Exterior doors shall have locksets keyed differently. Exterior doors of Construction Division Field Office shall be keyed to a master. Exterior doors shall include a deadbolt keyed alike with exterior knob. Restroom doors shall be solid core and shall have privacy locks.

1. Install hasps at exterior doors as directed by Engineer.

E. Inside spaces shall be of “earth tone” colors which do not readily show soiling.

F. Provide 100 foot-candle (1000 lux) fluorescent lighting measured at floor, in every area.

G. Provide office identification signs, 1 for each of the office’s outside front entrances. Signs shall be 3/4 inch plywood, white background, black letters. Logos on signs to match samples furnished by Engineer in terms of graphic design and color. Signs shall be affixed in locations designated by Engineer.

H. Provide necessary materials, anchoring, and appurtenances required for installation of the field office.

I. Provide stairways at exterior doors, including handrails and skirting in conformance with manufacturer’s standard items. Provide raised wood deck walkway between trailers including guardrails. Exterior framing lumber shall be pressure-treated; exterior plywood shall be treated with 2 coats of preservative containing wood boring insect deterrent (Termin-8) prior to painting. Submit walkway design to Engineer for approval.

J. Provide exterior lighting mounted on poles or at eaves of the trailer to provide adequate lighting for the trailer area and the adjacent parking area. Pole locations shall be as directed by Engineer.

K. Structures shall be weathertight. No broken windows and holes in exterior or interior walls shall be allowed. Wiring shall meet City of Los Angeles Electrical Code. Interior and exterior shall be free of dirt or writing, and habitable. Provide protection against extremes of heat and cold.

2.2 JANITORIAL SERVICE

A. Provide continuous janitorial service weekly or more frequently, to clean and maintain field office.

B. Provide and replenish kitchen and restroom supplies as necessary.

1. Kitchen supplies shall include paper towels, paper cups, and liquid soap.

2. Restroom supplies shall include toilet paper, paper towels, liquid soap, and toilet seat covers.

C. Provide monthly pest control services for field office.

2.3 UTILITIES AND SERVICES

A. Utilities:

1. Telephone service with telephone outlets, including telephone jacks and inside wiring, data jacks, electrical convenience outlets, lighting, plumbing, sewer (holding tank), heating, ventilating, and air conditioning shall be provided in conformance with City of Los Angeles Building Codes and applicable State of California laws and regulations for each trailer. Air conditioning and heating and return to be ducted above ceiling or under floor.

2. Contractor shall hook up toilet and sink water to existing City water lines or water tank. Contractor shall be responsible for installation and required permitting.

3. Contractor shall provide interior chemical flush toilets and pump out service.

a. Clean and replenish restroom supplies as necessary. Restroom supplies shall include toilet paper, paper towels, liquid soap, and toilet seat covers.

4. Provide a local area network comprising of Construction Division Field Office.

a. Connect a router to a switch in Construction Division Field Office. The router and switch shall be as specified in this Section.

b. Mount patch panel next to or on the rack in Construction Division Field Office. The router and switch in Construction Division Field Office shall be placed inside the rack. The rack shall be as specified in this Section.

c. Locate data jack locations in Construction Division Field Office, as directed by Engineer.

5. Provide, throughout the construction period, hot and cold bottled drinking water including paper cups, for the field office.

6. Pay for monthly use charges for utilities, including power, telephone, internet, water, and sewer (holding tank).

7. Pay for maintenance and repair costs necessary to maintain the offices in satisfactory functional condition. Maintenance costs shall include those needed to maintain, in working condition, office equipment including, but not limited to: copy and facsimile machines, refrigerators, and microwave ovens.

a. Failure to maintain the offices and furnishings and equipment shall result in withholding portions of Contractor’s progress payment commensurate with Engineer’s estimate of the costs of performing needed maintenance and repairs.

## 2.4 CONSTRUCTION, FURNITURE, AND EQUIPMENT – FIELD OFFICES

A. Construction Division Field Office (Exhibit No. 1):

1. Construction:

1 - Office, size 12'-0" by 16'-0" with full height (8 foot) partition walls and one 3’-0" by 6’-8" door.

6 - Offices, size 12'-0” by 12'-0" with full height (8 foot) partition walls and one 3’-0" by 6’-8" door.

1 - Office, size 10'-0" by 12'-0" with full height (8 foot) partition walls and one 3’-0" by 6’-8" door.

4 - Offices, size 8'-0" by 12' with full height (8 foot) partition walls and one 3’-0" by 6’-8" door.

1 - Conference room, 21’-6” by 12'-0” with full height partition (8 foot) partition walls and double doors.

1 - Copy/open area, 6’-0” by 12’-0” with full height (8 foot) partition walls.

1 - Men’s restroom

1 - Women’s restroom

1 - Kitchen area

2. Provide the following new freestanding equipment and new furniture:

12 - Wood desks, size 2'-6" by 5'-0" with 2’-0” by 4’-0” return for computer including keyboard tray and mousepad

30- Swivel chairs (G.E. Capital Modular Space Jr. Exec. Chair) with rollers

12- Transparent chair floor mats

26 - Side chairs (G.E. Capital Modular Space Guest Chair)

12 - Trash receptacles

1 - 18 seat executive wooden conference table

12 - Bookcases, 1'-0" deep by 3'-0" long by 6'-0" high, with multiple adjustable shelves

12 - Lockable 4-drawer legal file cabinets

1 - "Plan Hold" rolling stand series, pivot filing plan racks suitable for 36 inches by 48 inches prints

10 - "Plan Hold" binders suitable for 36 inches by 48 inches prints

2 - Dry erase white marker boards, 4’-0” by 6’-0”

12 - Dry erase white marker boards, 2'-0" by 3'-0"

1 - Bulletin board, Homasote, 4’-0” by 6’-0”

2 - Hard hat rack for 6 hats located near each exterior door.

2 - Coat racks located near each exterior door

Door mat at each exterior door

Boot cleaning device at each exterior door (brush and scraper)

4 - Additional shelves 12 inch by 4'-0"

4 - 6'-0" long plastic folding tables

1 - Lockable floor mounted corner cabinet, located under 30 inches high table top copier

1 - First aid kit to service up to 6 persons

2 - Fire extinguishers

2 - Panasonic Lumix TS5 digital cameras – (Department shall assume ownership upon delivery)

1 - 24 port patch panel

3. Provide the following wireless network equipment (Department shall assume ownership upon delivery):

   1 - Cisco Access Point, Model 9124

4. Provide the following Cisco 9300 Switch equipment (Department shall assume ownership upon delivery):

   2 - 1000Mbps Single Mode Rugged SFP, GLC-LX-SM-RGD

   1- Catalyst 9300 48-port UPOE, Network Advantage, C9300-48U-A

   1- SOLN SUPP 8X5XNBD Catalyst 9300 48-port UPOE, Network Advantage, CON-SSSNT-C93004UA

   1 - C9300 Network Advantage, 48-port license, C9300-NW-A-48

   1 - Cisco Catalyst 9300 XE 17.6 UNIVERSAL UNIVERSAL,SC9300UK9-176

   1 - 1000W AC 80+ platinum Config 1 Power Supply, PWR-CA-1100WAC-P

   1 - 1000W AC 80+ platinum Config 1 Secondary Power Supply, PWR-CA-1100WAC-P/2

   2 - North America AC Type A Power Cable, CAB-TA-NA

   1 - No SSD Card Selected, C9300-SSD-None

1 - 50CM Type 1 Stacking Cable, STACK-T1-50CM

1 - Catalyst Stack Power Cable 30 CM, CAB-SPWR-30CM

1 - TE agent for IOSXE on C9K, TE-C9K-SW

1 - Rubber feet for table top settings 9200 AND 9300, C9K-ACC-RBFT

1 - 12-24 AND 10-3 Screws for rack installation, QTY 4, C9K-ACC-SCR-4

1 - 1RU Cable Management Guides 9200 AND 9300, CAB-GUIDE-IRU

1 - C9300 DNA Advantage, 48-Port Term Licenses, C9300-DNA-A-48

1 - C9300 DNA Advantage, 48-Port, 3 Year Term License, C9300-DNA-A-48-3Y

1 - SOLN SUPP SW SUBC9300 DNA Advantage, CON-SSTCM-C93A48

1 - Cisco DNA Spaces Extend Term License for Catalyst, D-DNAS-EXT-S-T

1 - Cisco DNA Spaces Extended for Catalyst Switching - 3 Years, D-DNAS-EXT-S-3Y

1 - Cisco ThousandEyes Enterprise Adgent IBN Embedded, TE-EMBEDDED-T

1 - ThousandEyes - Enterprise Agents, TE-EMBEDDED-T-3Y

1 - Catalyst 9300 8 x 10GE Network Module, C9300-NM-8X

1 - Network Plug-n-Play Connect for zero-touch device deployment, NETWORK-PNP-LIC

5. Provide the following radio equipment (Department shall assume ownership upon delivery):

2 - TG261 Multipoint Radio - MPL-261-CNN

1 - Game changer cable - Outside Rated (OSP) product # 258330804

6. Provide the following electronics and miscellaneous equipment:

   12 - Personal Computer: HP Elite 800 G9 SFF i5 14500, 16GB RAM/512 SSD (Department shall assume ownership upon delivery)

   2 - Printer: HP 4001dn Laser JetPro Printer (Department shall assume ownership upon delivery)

   2 - USB-A to USB-B 2.0 printer cables, 10-feet

   12 - Monitor: Dell 34-inch Curved Video Conferencing Monitor, Model P3424WEB (Department shall assume ownership upon delivery)

   2 - TV: Samsung 70-inch UN70NU7200FXZA

   1 - Microsoft - Wireless Display Adapter V2 Receiver - Dark - Titanium

   2 - Dynex - 25 feet 4K Ultra HD HDMI Cable - Black

   2 - Dynex 47 to 75 inch Full Motion TV Wall Mount - Black

   11 - APC Back-Ups 900 VA Battery Backup & Surge Protector, BVN900M1

   1 - Insignia - Display Port-to-HDMI Adapter - Black

   1 - Logitech - MK270 wireless keyboard and mouse - black

   1 - Webcam: Logitech C920e

   11 - Avaya IP Telephone Model J179 H.323 compatible

   1 - Canon Image Runner C3480 Color Copier network compatible. Provide maintenance and supplies for the copier throughout Contract duration.

   1 - APC Net Shelter 2 Post Rack

7. 1 - Schneider Electric Device monitoring and management, Network Management Cards, NMC3 with Environmental Monitoring, secure remote UPS monitoring and management, Model AP9641

8. 1 - APC by Schneider Electric Smart-UPS SRT 1500VA RM 120V Network Card, 1500 VA/1350 W, 120 V AC, 5 Minute Stand-by Time, 2U Rack-mountable, 6 x NEMA 5-15R, Model SRT1500RMXLA-NC

9. Provide the following licenses for the duration of Contract:

   11 - Microsoft 365

   11 - Windows 11 Enterprise, pre-installed

   4 - Adobe Acrobat DC licenses

10. Provide the following stationary equipment and furniture:

    4 - Duplex outlets (110V) per office

    5 - Duplex outlets (110V) in main area

    4 - NEMA 15P power outlets near the patch panel, router and switch

    1 - NEMA L5-30P power outlet near the patch panel, router and switch

    --- Smoke detectors in each office

    1 - RJ 45 telephone jack to be placed as directed by Engineer for each instrument

    2 - RJ45 data jack to be placed in each office, in the conference room, and in the copier room as directed by Engineer with 4 pair category 6e data wire from each jack to a patch panel in the copier room in Construction Manager Field Office

    1 - Plan table, 30 inches by 72 inches, adjustable in height from 27 inches to 40 inches

11. Each restroom (Physically Disabled Accessible) shall include the following:

    1 - Standard vitreous china water closet

    1 - Lavatory (14 inches by 19 inches) in countertop with backsplash (hot and cold water fixture)

    1 - Toilet paper holder

    1 - Trash receptacle

    1 - Paper towel dispenser

    1 - Liquid soap dispenser

    1 - Toilet seat cover dispenser

1 - Mirror, 3’-0” by 4’-0”

1 - Wall light over mirror, size 4’-0”

1 - Ceiling mounted exhaust fan

1 - Wood door with privacy lock, size 3’-0” by 6’-8”

1 - Set of grab bars for disabled access as required by City of Los Angeles Building Code

1 - Ground fault duplex outlet (110V)

--- Storage cabinet of sufficient size to accommodate supplies listed in Article 2.3 A.3a of this Section.

12. Full height partition walls shall be acoustically insulated.

13. Kitchen shall include the following:

    1 - Coffee service including coffee maker (Keurig 2.0 or better), supplies (cups, stirrers, and the like), and condiments (coffee (K-pods), creamer, sugar, and the like)

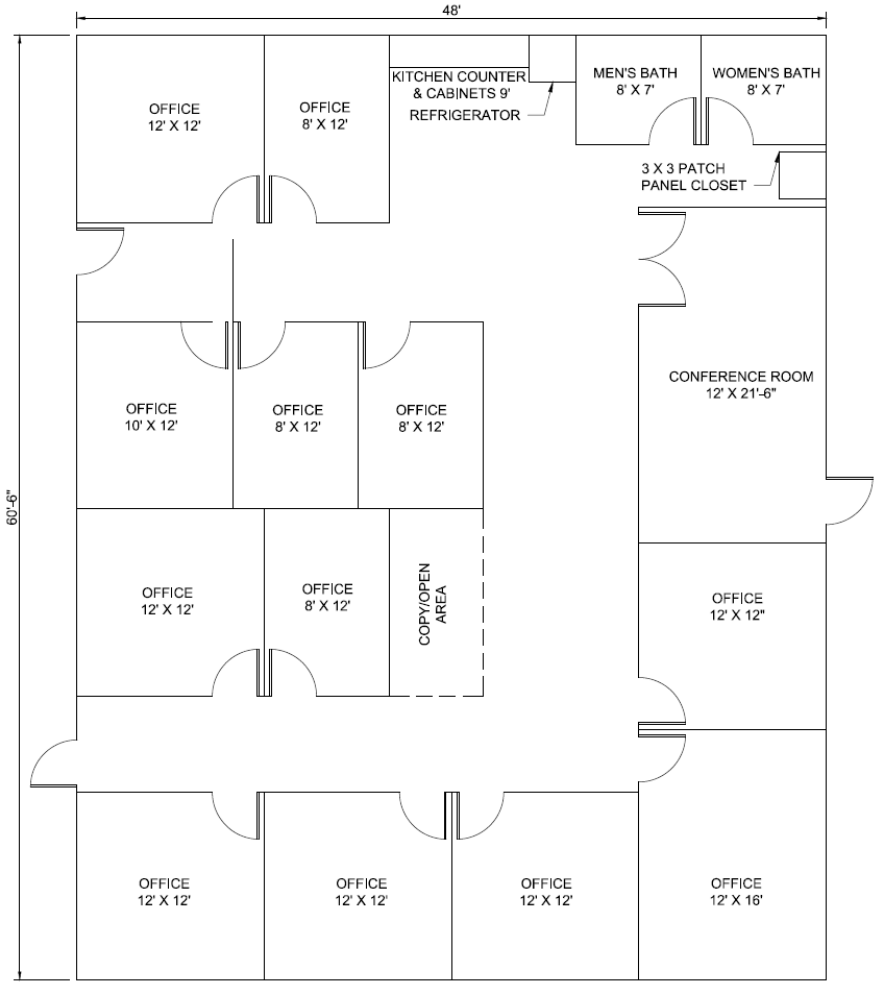
    1 - Refrigerator (minimum 12 cubic feet capacity)

    1 - Countertop and sink plumbed to office water and sewer system with garbage disposal

    1 - Microwave oven (750 watts)

    Locate appliances as directed by Engineer.

PART 3 - EXECUTION - NOT USED




Construction Division Field Office Exhibit No. 1

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary barrier rail to be installed around a phased work area.

1.2 RELATED SECTIONS

A. Section 32 31 13 - Chain Link Fences and Gates

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the corresponding Lump Sum Construction bid items of Bid Proposal Line Items.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The barrier rail units shall be new reinforced concrete units in conformance with the Caltrans Standard Specification Subsection 12-3.08 and in conformance with Standard Plan T3A modified with scuppers.

B. Chain link materials shall conform to CHAIN LINK FENCES AND GATES Section.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Place barriers continuously and without openings, with exception of accessways for Contractor and tenant.

B. Barrier rails shall have chain link fencing on top.

C. Placement connections and anchorage of the barrier rail units shall be in accordance with Drawings or as directed by Engineer.

D. Disassemble and remove from Project Site temporary barrier rail upon completion of phased Work area and at the direction of Engineer.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Procedures for ensuring optimal diversion of construction and demolition waste generated by Project and documentation procedures for tracking waste generation and diversion.

1. Project shall promote City's sustainable building efforts by creating a resource-efficient and environmentally sensitive Project and maintaining optimum control of Construction and Demolition (C&D) waste generated during Project.

2. Project shall use products with post-consumer recycled content to the greatest extent feasible. Refer to California Department of Resources Recycling and Recovery's (CalRecycle's) website for information about recycled content construction products.

## 1.2 ABBREVIATIONS

A. CalMAX: California Materials Exchange

B. CalRecycle: California Department of Resources Recycling and Recovery

C. C&D: Construction and Demolition

D. CCR: California Code of Regulations

E. CDRG: Construction and Demolition Recycling Guide

F. LEA: Local Enforcement Agency

G. SWDD Report: Solid Waste Diversion and Disposal Report

H. WMP: Waste Management Plan

1.3 DEFINITIONS

A. Certified C&D Waste Processing Facility or Certified C&D Waste Processor: A solid waste processing facility that accepts loads of C&D waste for the purpose of recovering re-usable and recyclable materials and disposing of the non-recyclable residual material. A Certified C&D Waste Processing Facility has been certified by City of Los Angeles (City) Bureau of Sanitation to have a facility specific recycling rate for C&D waste. For information on becoming a certified C&D waste processor, refer to: https://www.lacitysan.org/san/faces/home/portal/s-lsh-wwd/s-lsh-wwd-s/s-lsh-wwd-s-r/s-lsh-wwd-s-r-cdr?_adf.ctrl-state=1d5d9u35ny_1&_afrLoop=4798033367694392&_afrWindowMode=0&_afrWindowId=null#!%40%40%3F_afrWindowId%3Dnull%26_afrLoop%3D4798033367694392%26_afrWindowMode%3D0%26_adf.ctrl-state%3D1d5d9u35ny_5. See CDRG for information on the current list of certified processors and recycling facilities.

B. Class III Landfill: A landfill that accepts non-hazardous solid waste such as household, commercial, and industrial solid waste. A Class III landfill is regulated by LEA and shall have a CalRecycle solid waste facilities permit.

C. Construction and Demolition Recycling Guide (CDRG): A publication by City of Los Angeles Department of Public Works, Bureau of Sanitation, Solid Resources Citywide Recycling Division. CDRG can be found at: https://www.lacitysan.org/cs/groups/pressrelease/documents/document/y250/mdgy/~edisp/cnt082545.pdf.

D. C&D Waste or Mixed C&D Waste or C&D Debris or Mixed C&D Debris: Solid waste and recyclable materials, and building materials from construction, deconstruction, remodeling, repair, or demolition of buildings and other structures, do not contain hazardous waste (as defined in CCR Title 22, Section 66261.3, et seq.), and contain no more than 1 percent putrescible wastes by volume, calculated on a monthly basis. C&D waste includes, but is not limited to: asphalt, concrete, Portland cement, brick, lumber, drywall, roofing material, ceramic tile, pipe, glass, carpet, and associated packaging.

E. Deconstruction: The process of taking apart a structure with the primary goal of preserving the value of useful building materials, so that they may be reused or recycled.

F. Disposal: Acceptance of solid waste at a legally operating facility for the purpose of landfilling.

G. Diversion: Activities that result in reducing the amount of solid waste disposed at a landfill. This can include source reduction activities, composting, recycling, and reuse.

H. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert debris is taken for the purpose of filling an excavation, shoring, or another soils engineering operation.

I. Inert Debris: Solid waste and recyclable materials that are source separated or separated for reuse and do not contain hazardous waste (as defined in CCR, Title 22, Section 66261.3 et seq.) or soluble pollutants at concentrations in excess of applicable water quality. Inert debris may not contain any putrescible wastes. Inert debris includes but is not limited to concrete, asphalt, crushed glass, fiberglass, asphalt or fiberglass roofing shingles, brick, slag, ceramics, plaster, clay, and clay products.

J. Inert Debris Engineered Fill Operation (IDEFO): An activity exceeding 1 year in duration in which only the following inert debris may be used: fully cured asphalt, uncontaminated concrete (including steel reinforcing rods embedded in the concrete), crushed glass, brick, ceramics, clay and clay products, which may be mixed with rock and soil. Those materials are spread on land in lifts and compacted under controlled conditions to achieve a uniform and dense mass which is capable of supporting structural loading, as necessary, or supporting other uses such as recreation, agriculture, and open space in order to provide land that is appropriate for an end use consistent with approved local general and specific plans (e.g. roads, building sites, or other improvements) where an engineered fill is required to facilitate productive use(s) of the land.

K. Non-Permitted Solid Waste Hauler: A company that does not possess a valid and current solid waste from individuals or businesses in City of Los Angeles.

L. Permitted Solid Waste Hauler: A company that possesses a valid and current solid waste hauler permit from City of Los Angeles to collect and transport solid waste from individuals or businesses in City of Los Angeles. Refer to: https://www.lacitysan.org/san/faces/wcnav_externalId/s-lsh-wwd-s-c-whp?_adf.ctrl-state=jir2v5wty_2037&_afrLoop=14808459037152891&_afrWindowMode=0&_afrWindowId=null#!%40%40%3F_afrWindowId%3Dnull%26_afrLoop%3D14808459037152891%26_afrWindowMode%3D0%26_adf.ctrl-state%3Djir2v5wty_2041.

M. Recycling: The process of collecting, sorting, cleansing, treating, and reconstituting materials that would otherwise become solid waste, and returning them to the economic mainstream in the form of raw material for new, reused, or reconstituted products that meet the quality standards necessary to be used in the marketplace.

1. On-site Recycling: Materials that are sorted and processed for use in an altered form in Project, (e.g. concrete is crushed for use as base for a parking lot on Project Site).

2. Off-site Recycling: Source-separated materials hauled to another location and used in an altered form in the manufacture of a new product.

N. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of a new product. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a Solid Waste Facilities permit from CalRecycle or be regulated by LEA.

O. Reuse: Materials that are recovered for use in the same form. This includes materials that are reused on-site or off-site.

P. Salvage: Materials recovered for reuse or sale or donation to a third party.

Q. Source Reduction: Any action causing a net reduction in the generation of solid waste. Source reduction includes, but is not limited to, reducing the use of non-recyclable materials, replacing disposable materials and products with reusable materials and products, reducing packaging, and reducing the amount of yard waste generated.

R. Source-Separated Materials (Construction and Demolition Waste): Material that is sorted at the site of generation by individual material type for the purpose of reuse or recycling, i.e., loads of concrete that are source-separated for delivery to an inert debris recycling facility to be crushed into road base material. Note: Contractor may be able to save money on collection fees for source-separated material. Source-separated material is not subject to City's 10 percent AB 939 fee.

S. Solid Waste: Shall mean waste that CalRecycle has deemed acceptable for disposal at a Class III Landfill and shall not include source-separated material.

T. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal or recovering some materials for reuse or recycling. Transfer stations shall be permitted by CalRecycle and regulated by LEA.

U. Solid Waste Hauler or Waste Hauler: Shall mean any person engaged in the business of providing or responsible for the collection, removal, or transportation of Solid Waste, Construction and Demolition Waste, Source-Separated Materials.

V. Solid Waste Hauler Permit, Waste Hauler Permit, or AB 939 Compliance Permit: Persons who collect, remove, or transport Solid Waste, including Construction and Demolition Waste, Source-Separated Materials or co-mingled recyclables, generated with City, shall obtain, in addition to other required permits, and AB 939 Compliance Permit from City of Los Angeles, Department of Public Works Bureau of Sanitation.

1.4 DIVERSION REQUIREMENTS

A. Each construction or demolition Project shall reuse or recycle a minimum of 80 percent of the inert debris and 65 percent of the remaining construction and demolition waste generated by Project.

B. Each construction or demolition Project shall dispose of construction and demolition waste generated from Project in conformance with City's C&D Waste Recycling Ordinance (Ordinance No. 181519). Los Angeles Municipal Code requires that mixed C&D waste generated within City of Los Angeles be taken to a City Certified C&D Waste Processing Facility and source separated C&D waste be taken to a recycling facility or City Certified C&D Waste Processing Facility. Further, C&D waste can only be legally collected, removed, or transported by City of Los Angeles Permitted Solid Waste Haulers. If Contractor plans on collecting, removing, or transporting its own waste, Contractor shall first apply for and obtain a Solid Waste Hauler Permit from Solid Resources Citywide Recycling Division (SRCRD) of the Bureau of Sanitation.

C. Failure to meet the C&D waste recycling requirements as detailed in Paragraphs 1.4 A and B of this Article shall result in the assessment of penalties up to $5,000 per each load of mixed C&D waste not taken to City Certified C&D Waste Processing Facility. Further, collecting, removing, or transporting C&D waste within City without a valid Solid Waste Hauler Permit is a criminal misdemeanor subject to fines and/or imprisonment.

## 1.5 SUBMITTALS

A. Waste Management Plan (WMP): Conduct a Project Site assessment and estimate the types and quantities of materials, generated during Project, that are anticipated for on-site or off-site processing, recycling, or reuse.

1. Not more than 10 working days after Notice to Proceed, submit to Engineer a written WMP, Attachment A, based on forms in Appendix "E" of Specifications. The plan shall show a minimum 80 percent recycling for inert debris expected from Project and 65 percent recycling for the remaining C&D waste expected from Project. Submit the plan in the format as shown on Attachment A provided in Appendix "E" of Specifications. Instructions for filling out the form are in Attachment A, Instruction Sheet for Waste Management Plan included in Appendix "E" of Specifications. Work shall not begin until Engineer approves WMP for Project.

2. If Contractor expects a circumstance that Contractor believes makes it infeasible to comply with the Diversion Requirement, Contractor may submit a written request for an exemption at the time WMP is submitted. If the exemption request is not approved by Engineer, revise and resubmit a WMP.

3. If City determines that it is infeasible for Contractor to meet Diversion Requirement due to unique circumstances, City shall determine the maximum feasible diversion rate for each material and shall indicate this rate on WMP submitted by Contractor. City shall return a copy of WMP to Contractor marked "Approved for Infeasible Exemption". Contractor shall be required to meet the maximum feasible diversion rates as approved by City. If Contractor fails to meet revised rates, Contractor shall be subject to the stipulated penalties. Exempt Projects are required to keep and submit documentation for Project. This includes receipts, WMP, SWDD Reports, and supporting documentation as required in this Section.

4. City's approval of Contractor's WMP shall not otherwise relieve Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures.

B. Solid Waste Diversion and Disposal Report (SWDD Report): One week prior to the first of every month, and prior to Engineer's monthly progress estimate for payment, Contractor shall prepare and submit to Engineer a written SWDD Report quantifying material generated, diverted, and disposed in Project during the time period covered by SWDD Report and progress payment. Part 3 of each SWDD Report is a cumulative history of the diversion and disposal for Project. Submit the report in the format provided in Attachment B included in Appendix "E" of Specifications. Failure to submit the report and the supporting documentation shall render the application for progress payment incomplete and delay payment until the proper documentation is submitted. The supporting documentation includes manifests, weight tickets, receipts, reports, invoices, and other supporting documents specifically identifying the projects, the recyclables and solid waste generated by Project, and where the material was sent. Instructions for filling out the forms are in Attachment B, Instruction Sheet for Solid Waste Diversion & Disposal Report included in Appendix "E" of Specifications. Together, all of the SWDD Reports shall cover the complete time period of Project. The final SWDD Report and supporting documentation shall be submitted within 30 Calendar Days of substantial completion of Project but before Affidavits of Completion are submitted.

C. Substitutions: Should Contractor desire to use materials, equipment, or products that meet the requirements of these specifications but are more environmentally responsive, Contractor shall submit these substitutions in conformance with Proprietary Names and Substitutions Subsection of GENERAL CONDITIONS Section.

1.6 PENALTY

A. If the diversion requirement has not been met, a per ton penalty shall be applied to the disposed material over that allowed in approved WMP.

B. The penalty shall be calculated as follows: Tons over that allowed in the approved WMP times the per-ton penalty in effect at the time Contract was awarded. The penalty may not exceed the total payment retention for Project.

C. Tons of mixed C&D waste either not hauled to City Certified C&D Waste Processing Facilities or hauled by non-permitted waste haulers shall be assessed a per-ton penalty. The penalty may not exceed the total payment retention for Project.

D. The penalty is $100 per ton.

E. The recommended penalty shall be determined by Bureau of Contract Administration and Bureau of Sanitation and shall be considered by Board of Harbor Commissioners at the time of Project closeout.

1.7 WASTE MANAGEMENT PLAN SUBMITTAL MEETING

A. On or about 5 working days after Notice to Proceed, Engineer shall schedule and attend a meeting with Contractor to discuss the proposed WMP submittal. This meeting shall be held to allow Department and Contractor an opportunity to develop a mutual understanding regarding the recycling and reuse requirements and programs.

1.8 REUSE, SALVAGE, AND RECYCLING OPTIONS

A. Construction projects shall make use of as many reuse and salvage options as is feasible. One option is CalMAX, a free program sponsored by CalRecycle. The most recent issues of CDRG, contains contact information for non-profit organizations, salvage facilities, and other reuse organizations.

B. Recycling shall include both on-site and off-site recycling of source-separated materials, as well as mixed C&D waste recycling efforts.

C. On-site recycling programs shall produce a quality product to meet Specifications identified in Contract Documents, subject to approval. Estimate the amount of material to be used in Project and include a program for off-site recycling of any excess material that cannot be used in Project.

D. Develop and implement a program to include source separation of solid waste, to the greatest extent feasible, of the following types:

1. Asphalt

2. Concrete, concrete block, slump stone (decorative concrete block)

3. Rock

4. Wood (lumber)

5. Green material (i.e. tree trimmings)

6. Other materials, as appropriate, such as red clay brick, building fixtures, architectural details, drywall, carpet, carpet padding, and corrugated cardboard.

E. Mixed C&D Waste Recycling: Develop and implement a program to transport commingled construction and demolition materials that cannot be feasibly source-separated to Certified C&D Waste Processing Facility.

F. Certified C&D Waste Processing Facility: These facilities have facility recycling rates, established by City of Los Angeles for mixed C&D waste. Mixed C&D waste taken to these facilities are considered to have been recycled at the rate of the certified processing facility. For example, 100 tons of material taken to a facility with an 80 percent recycling rate results in 80 tons of recycling and 20 tons of disposal for Project. A list of these facilities and their recycling rates is in the most recent issue of CDRG.

G. Recycling, Reuse, Mixed C&D Waste Processing, and Salvage Facilities: CDRG is incorporated in this Section by reference and contains information about processing, recycling, reuse, and salvage facilities.

H. Revenue: Revenue or savings obtained from recycled, reused, or salvaged materials shall accrue to Contractor unless otherwise noted in Contract Documents. Note: Contractor may be able to save money on collection fees for source-separated material. Source-separated material is not subject to City's 10 percent AB 939 fee.

I. AB 939 Fee: AB 939 fee is assessed on solid waste hauled within City of Los Angeles in conformance with Section 66.32 of Los Angeles Municipal Code.

1. Solid waste haulers hauling material from City of Los Angeles locations must be permitted in conformance with Section 66.32 of City of Los Angeles Municipal Code.

2. Source-separated material is not assessed this fee.

1.9 HAULING AND DISPOSAL OPERATIONS

A. Hauling: Arrange the collection and hauling of C&D waste by a solid waste hauler that is permitted by City of Los Angeles in conformance with Section 66.32 of Los Angeles Municipal Code.

B. Recycling and Processing Facilities: Transport C&D waste to recycling or processing facilities. Contractor shall be familiar with the requirements for acceptance of C&D waste at the recycling and processing facilities before the material is delivered. The most recent issue of CDRG, includes a partial list of these facilities. Always call facilities in advance.

C. Disposal Facilities: Transport C&D waste that cannot be accepted at a recycling or processing facility, to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal. A load of C&D waste may be taken to a disposal facility only after it has been rejected by 2 different certified processing facilities and the driver is in possession of both rejection slips. The rejection slips and the weight ticket from the final destination shall be kept together and submitted to Contractor and copy furnished to Engineer.

D. Project Site Disposal: Do not burn, bury, or otherwise dispose of solid waste on the Project Site.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION - NOT USED

END OF SECTION

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Procedures and requirements for preparation and submittal of "As-Built" set of Record Documents including, but not limited to, Drawings and Specifications utilizing Bluebeam Revu Core Annual Subscriptions and AutoCAD.

### 1.2 PRICE AND PAYMENT PROCEDURES

A. A $5,000 per month minimum shall be included as a line item in the Schedule of Values of the corresponding Lump Sum Construction bid items of Bid Proposal Line Items for project record documents. Project Record Documents are considered complete when approved by Engineer.

### 1.3 SUBMITTALS

A. Engineer's approval of the up-to-date status of Record Documents is a prerequisite for the approval of requests for progress payments.

B. Submit the final Record Documents, consisting of marked up Drawings, Specifications, and additional drawings, to Engineer in digital and paper formats for approval upon completion of Project and prior to submitting Affidavit of Completion.

C. Project Record Documents shall be updated daily for review and approval and shall consist of marked up Drawings and Specifications utilizing Bluebeam. Submit the final Record Documents, consisting of marked up Drawings, Specifications, and additional drawings to Engineer in Bluebeam and AutoCAD for approval upon completion of Project and prior to submitting Affidavit of Completion.

### 1.4 DESCRIPTION - PROJECT SET RECORD DOCUMENTS

A. Following Award of Contract, secure from Engineer (at no charge) 1 complete set of “As Bid” Drawings and conformed Specifications to be the basis of Project Set Record Documents.

B. Provide 15 Bluebeam Revu Core Annual Subscriptions for Department for the duration of Contract Time and for an additional 6 months.

C. Engineer shall create and manage a Bluebeam Revu Studio Session. Contractor shall make entries to project record documents within the Bluebeam Revu Studio Session. Contractor shall coordinate with Engineer for a list of Revu attendees.

D. Following Award of Contract, Engineer shall provide a complete set of "As Bid" Drawings and conformed Specifications in digital portable document format (PDF) via Bluebeam Revu Studio Session and full size hard-copy format to be the basis of Project Set Project Record Documents.

E. Project Set Record Documents shall be identified with the title "RECORD DOCUMENTS - PROJECT SET". Project Set shall be used for no purpose other than the entry of data and review by Engineer.

1.5 ENTRIES ON JOB SET

A. The following entries shall be made on Bluebeam:

1. Enter changes on Drawings and Specifications, as applicable.

2. Describe and date changes by note and graphic line. Emphasize entry by a "cloud" around the affected area or areas. In the event of overlapping changes, different colors may be used for each change.

3. Include changes clearly marked on Drawings from sources, including responses to Requests for Information (RFIs), product substitutions, and delta revision changes transmitted from Engineer.

4. Note authority and reason for each change.

5. Reference change on any other affected sheets.

6. Enter make and model of equipment installed in the Project.

7. Maintain record documents "as-current" continually and available for examination by Engineer, upon request.

B. The following entries shall be made on AutoCAD and shall include hard-copy and electronic AutoCAD files of "As-Builts":

1. Note actual location (dimension, elevations, depths, stations) of substructures constructed (including pile tip elevation, sewer wyes and laterals, utility stubouts, and Work shown schematically) and existing substructures encountered during construction. Call for survey to determine as-built alignment and elevation as required before concealing Work.

1.6 CONVERSION OF SCHEMATIC LAYOUTS TO AS-BUILT DRAWINGS

A. Where Work is shown on Drawings by use of a schematic diagram, supplement the diagram or provide a new drawing, in a manner approved by Engineer, to show the actual dimensioned locations, elevations, and details of Work.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Basic site materials, methods, and requirements to locate, protect, repair, remove, replace, and dispose of existing surface and subsurface conditions and improvements at Project Site, including existing utilities, structures, and substructures.

B. Basic materials and methods common to new Project Site construction.

## 1.2 RELATED SECTIONS

A. Section 02 41 13 - Selective Site Demolition

B. Section 02 61 14 - Excavating, Stockpiling, and Disposing of Chemically Impacted Soil

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be included in each corresponding bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.

B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).

C. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

D. Reference Specifications (RS):

Section 201 - Concrete, Mortar, and Related Materials

Section 306 - Open Trench Conduit Construction

Subsection 306-3.3 - Removal and Abandonment of Existing Conduits and Structures

Section 401 - Removal

Subsection 401-2 - Asphalt Concrete Pavement

Subsection 401-3.1 - Concrete Pavement

1.5 EXISTING SUBSURFACE CONDITIONS

A. Locations of existing pipelines, utilities, and substructures shown on Drawings are approximate only.

B. Keep existing services and facilities in operation except when Engineer permits shutdown in writing, and then only after temporary services have been provided.

C. Refer to SITE CONDITIONS Section for additional requirements.

PART 2 - PRODUCTS

2.1 CEMENTITIOUS SLURRY MATERIAL

A. Cement-Sand Slurry: Class 100-E-100 in conformance with RS Subsection 201-1.3.3, Table 201-1.3.3.

B. Concrete for High Voltage (Greater than 600 volts) Encasement: Concrete shall be Class 450-C-2000 in conformance with RS Subsection 201-1.3.3, Table 201-1.3.3, red tinted with 5 pounds liquid equivalent of Mastercolor (formerly Rheocolor L) Liquid coloring admixture as manufactured by BASF or similar coloring product approved by Engineer.

PART 3 – EXECUTION

3.1 VERIFICATION OF SITE CONDITIONS

A. Notify Underground Service Alert 2 working days prior to commencing demolition, excavating, trenching, drilling, or similar underground Work.

B. Contact owners of existing lines and substructures that may interfere with Work.

C. Determine and mark locations of substructures not marked by owners. In addition to the substructure information shown on Drawings, maps and reference drawings showing record locations of substructures are available for review in the office of Engineer. Refer to CONTRACT DOCUMENTS Section for reference drawing numbers. Department neither belongs to Underground Service Alert nor participates in its activities. Department does not mark substructures in the field.

D. Hand-dig excavations to design depths where alignments shown on Drawings occur within 5 feet radially of existing utilities. Hand-dig until the existing utility is located.

## 3.2 PROTECTION OF EXISTING FACILITIES

A. Protect existing facilities adjacent to Work to avoid damage. Repair or replace existing structures and improvements located above or below ground which are damaged or removed as a result of Contractor's operations wherever such existing improvements are not specifically designated to be permanently removed. Structures to protect and repair include, but are not limited to, asphalt concrete and concrete pavement, pipelines, wires, cables, electrical pull boxes, conduits, vaults, and maintenance holes. Repairs and replacements shall be made at Contractor’s sole cost and expense and shall be equal to existing improvements and shall match existing in finish and dimension.

1. Replacement asphalt concrete pavement shall be 1 inch greater in thickness than the existing pavement that was removed.

2. Damaged Pipelines:

    a. Replace damaged pipeline section(s) up to and including the joints at the end of the damaged section(s).

    b. Replace damaged joint materials.

B. Place barricades and install warning lights around excavations.

C. Exercise extreme caution when working in the vicinity of existing power poles and light poles designated to remain. Support Department of Water and Power and other utilities’ poles and guy wires as occur adjacent to excavations in conformance with the requirements of the utility owning the pole.

## 3.3 BASIC PAVEMENT REMOVAL METHODS

A. Perform asphalt concrete pavement removal in conformance with RS Subsection 401-2 and, where the removal line shall be a join line, saw cut line to full depth to provide a butt joint.

B. Concrete pavement removal shall conform to RS Subsections 401-3.1, except that the saw cut shall be made to a depth of 3 inches. Assume that concrete slabs are reinforced.

C. Removal Work performed beyond the lines and grades shown on Drawings, or beyond limits described in excavation and demolition submittal approved by Engineer, shall be considered to be unauthorized and at the sole cost and expense of Contractor. Engineer may order Contractor to restore such removals in conformance with Protection of Existing Facilities Article of this Section.

3.4 BASIC BACKFILL AND COMPACTION METHODS

A. Earth soil compaction shall be 95 percent relative compaction for top 12-inches and 90 percent relative compaction below that unless indicated otherwise on Drawings or Specifications. Exceptions:

1. Compaction recommendations from Project geotechnical report.

2. Soil requiring 95 percent compaction throughout as required by City of Los Angeles Building Code, Chapter 70 "Fills" Section, as determined and directed by Engineer.

B. Jetting and flooding is not permitted for compaction of trench backfill. Mechanical compaction of soil is required.

C. Removal areas 5 feet by 5 feet or less and surrounded by pavement to remain in place on 3 or 4 sides shall be backfilled with cement sand slurry up to the bottom of proposed pavement.

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Engineer shall take samples of the soil to be compacted to determine the optimum moisture content and maximum dry density of the soil in conformance with ASTM D1557.

2. Department shall perform field testing of compacted soil in conformance with American Society for Testing and Materials (ASTM International) standards, including ASTM D6938 (nuclear methods) or ASTM D1556/D1556M (sand-cone method). Department shall perform compaction tests, 1 time, at no expense to Contractor. Department shall perform retests required due to inadequate compaction at Contractor's sole cost and expense. Contractor shall allow 2 working days in construction schedule for tests to be run and results to be furnished.

a. Make requests for testing 24 hours in advance through Engineer.

## 3.6 INTERFERING SUBSTRUCTURES

A. Consult Engineer immediately for directions whenever substructures not shown on Drawings interfere with or affect Work. Contractor shall propose means and methods to Engineer to deal with the interferences. Engineer shall make final decision on method of correction or protection to be used.

1. If interfering substructures must be removed, the following shall be done before removing or cutting the substructures:

   a. Tap the line and determine if the line contains any kind of liquid or gaseous material.

   b. If storm drain or sewer lines are empty or filled with concrete or mud slurry, lines may be cut, removed, and capped or plugged, in conformance with RS Subsection 306-3.3.

   c. Test conductors in conduits appearing to be abandoned and verify that conductors are de-energized. Remove de-energized conductors. Report energized conductors to Engineer and cease removal Work until Engineer authorizes Work to resume.

   d. Consult Engineer for methods of handling other substructures.

   e. Notify Engineer to identify contents of unknown line if it is found to contain liquid or gaseous material. Remove contents and dispose in conformance with applicable regulations. Such Work shall be considered a Change in Work and payment shall be determined in conformance with GENERAL CONDITIONS Section.

   f. Test pipeline coatings for asbestos-containing materials (ACM) or other toxic substances. Remove, handle, and dispose of hazardous pipeline coatings in conformance with applicable regulations. Such Work shall be considered a Change in Work and payment shall be determined in conformance with GENERAL CONDITIONS Section. A description of Work shall be submitted to Engineer when Work is complete.

2. Evacuated lines or remaining portions of abandoned lines shall be capped or removed as described in this Article for empty lines.

3.7 OWNERSHIP AND DISPOSAL

A. Asphalt concrete and other bituminous pavement, concrete rubble, unreinforced concrete, rocks, concrete masonry, and reinforced concrete demolished at Project Site shall become property of Contractor and shall be recycled in conformance with Contractor's Waste Management Plan (WMP) as described in CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT Section of Specifications.

1. The following materials shall be disposed of as specified in Paragraph B of this Article: Bricks; concrete-filled steel posts; heavily reinforced concrete items, such as concrete piles, concrete railroad ties, creosote-contaminated asphalt concrete cold millings from between railroad tracks with timber ties, and wire-mesh-reinforced concrete.

B. Materials to be removed other than those shown on Drawings to remain or be salvaged, or listed in Salvage Article of SELECTIVE SITE DEMOLITION Section, shall become the property of Contractor and shall be disposed of off Department property in conformance with Contractor’s Waste Management Plan.

3.8 CHEMICALLY IMPACTED SOIL

A. Refer to EXCAVATING, STOCKPILING, AND DISPOSING OF CHEMICALLY IMPACTED SOIL Section.

3.9 MAINTENANCE AND REPAIR

A. Unpaved access roads servicing Project may become unstable during rainy weather. Maintain unpaved access roads to allow passage of Contractor’s as well as Department’s trucks and passenger vehicles at Contractor’s sole cost and expense.

B. Maintain continuity and integrity of permanent fences and temporary construction fences. Immediately replace fence sections damaged or missing during construction prior to close of the regular working day upon which damage occurred.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Selective demolition and removal Work including disposal but not limited to the following:

1. Concrete demolition and removals
2. Asphalt concrete and concrete pavement removals
3. Asphalt berm removals
4. Curbs, ramps, gutters, driveways, and sidewalks removals
5. Railroad track and ties removals
6. Chain-link fencing, chain-link gate, and related footings removals
7. Guard posts and related footings removals
8. Sign posts and related footings removals
9. Pavement markings removals
10. Wheel stops removals
11. Vitrified clay pipe removals
12. Tree Removal

B. Develop waste management plan in conformance with CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT Section.

1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 31 00 00 - Earthwork

C. Section 31 50 01 - Excavation Safety Requirements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the corresponding bid items of Bid Proposal Line Items.

1.4 REFERENCES

A. 29 CFR 1926.200 - Accident prevention signs and tags.

B. ANSI Z535.5 - Safety Tags and Barricade Tapes (for Temporary Hazards).

C. Reference Specifications (RS):

Section 300-1 - Clearing and Grubbing

Section 306 - Open Trench Conduit Construction

1.5 SUBMITTALS

A. Procedures, equipment to be used, and operational sequences.

B. Submit prior to start of Work photographs of existing damage to structures adjacent to but not a part of Work where such damage could be misconstrued as caused by Contractor.

1.6 TRAFFIC MAINTENANCE

A. Refer to REGULATORY REQUIREMENTS Section.

1.7 SALVAGE

A. No on-site sale of salvage shall be allowed. No removals shall be made from Project Site by any person other than Contractor or employees of Contractor.

B. Refer also to CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT Section for other requirements.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Refer to REGULATORY REQUIREMENTS and COORDINATION Sections for South Coast Air Quality Management District (SCAQMD) notification and permit requirements.

PART 2 - PRODUCTS

2.1 BACKFILL MATERIALS

A. Fill, where required for backfill of voids, shall be in conformance with EARTHWORK Section.

## PART 3 - EXECUTION

### 3.1 DEMOLITION AND REMOVALS

A. Removal Work shall not exceed the limits shown on Drawings.

B. Control dust in conformance with REGULATORY REQUIREMENTS Section.

C. Items not shown on Drawings or mentioned in Specifications, which are encountered during Contractor's operations shall be brought to the attention of Engineer. Engineer shall determine the disposition of the items.

D. Obtain permission from Engineer and terminal manager, if need arises, to traverse adjacent portions of the terminal or other properties with outriggers, swinging cranes, or other heavy equipment. Refer to SITE CONDITIONS Section, Contractor’s Use of Site Article.

E. Should Contractor decide to move any large items intact off Project Site, Contractor shall make arrangements for permits, clearances, and utilities.

F. Remove vermin infested and harmful materials from Project Site. Dispose of materials in conformance with applicable health regulations to protect workers, tenants, and the public.

G. Perform demolition and removals under Engineer's inspection in conformance with applicable safety standards and requirements.

H. Burning of material on-site is prohibited.

I. No debris shall be allowed to enter harbor waters.

J. Perform pavement removals in conformance with BASIC SITE MATERIALS AND METHODS Section.

K. Repair or replace surface and subsurface improvements removed or damaged as a result of Contractor’s operations in conformance with BASIC SITE MATERIALS AND METHODS Section.

L. On-site crushing of removed asphalt concrete and concrete materials is prohibited.

### 3.2 SAFETY AND PROTECTION

A. Protect existing buildings, substructures, and other improvements within and adjacent to Project Site in conformance with BASIC SITE MATERIALS AND METHODS and EXCAVATION SAFETY REQUIREMENTS Sections.

B. Provide, erect, and maintain barriers, barricades, lighting, and guard rails as required to protect general public, workers, and adjoining properties.

C. Cease operation and notify Engineer immediately if demolition appears to endanger life, facilities, or property. Do not resume operations until safe conditions have been restored.

D. Post hazard warning signage compliant with requirements of 29 CFR 1926.200 and recommendations of ANSI Z535.5 at perimeter fence. Promptly remove signage after Engineer verifies that demolition hazards no longer exist.

E. Refer to REGULATORY REQUIREMENTS Section for additional requirements in the event that hazardous wastes are discovered.

3.3 OWNERSHIP AND DISPOSAL

A. Refer to BASIC SITE MATERIALS AND METHODS Section for requirements concerning ownership and disposal criteria for demolished materials.

3.4 BACKFILL EXCAVATIONS

A. Mechanically backfill voids in subgrade areas in conformance with BASIC SITE MATERIALS AND METHODS Section.

3.5 CONDUIT AND SUBSTRUCTURE ABANDONMENT

A. Interfering conduits and substructures not shown on Drawings shall be handled in conformance with BASIC SITE MATERIALS AND METHODS Section.

B. Seal conduits, storm drain, and sanitary sewer pipes where abandonment is required on Drawings in conformance with RS Subsection 306-3.3. Refer to Drawings for capping of other underground pipes.

3.6 TOXIC MATERIAL REMOVALS

A. Dispose of creosote, pentachlorophenol, or ACZA-containing materials, including timber power poles and railroad ties, in conformance with REGULATORY REQUIREMENTS Section. Unless indicated otherwise on Drawings or reference drawings, assume timber railroad tie spacing at 19 1/2 inches on center for existing track system embedded in asphalt concrete.

## 3.7 HIGH VOLTAGE POWER POLES

A. Refer to BASIC SITE MATERIALS AND METHODS Section for Work around existing power poles and light poles.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Design, qualifications, and permit requirements for staging areas and stockpiles, excavating and stockpiling potential chemically impacted soil (potential CIS) and chemically impacted soil (CIS) as directed by Engineer where unexpectedly encountered during performance of Work scope including but not limited to:

1. Personnel qualifications
2. South Coast Air Quality Management District (SCAQMD) permit requirements
3. Safety and health requirements
4. Soil excavation requirements
5. Soil staging and stockpiling requirements
6. Soil sampling, characterization, testing, and profiling requirements
7. Air emission monitoring requirements
8. Stormwater runoff control requirements
9. Leachate and stormwater collection and disposal requirements
10. Backfill requirements
11. Disposal or recycling facility acceptance and manifest requirements
12. Transportation requirements
13. CIS loading and unloading requirements

B. Verdantas Inc. has prepared a soil management report. Refer to the Soil Management Plan for Avalon Gateway Promenade Report included as part of the bid package.

## 1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 02 41 13 - Selective Site Demolition

C. Section 31 00 00 - Earthwork

1.3 PRICE AND PAYMENT PROCEDURES

A. The following shall be considered incidental to Work described in each bid item and no additional payment shall be made for the following Work:

1. Staging area construction including construction, inspection, and maintenance of soil cells and stockpiles.

2. Air quality monitoring and other CIS and potential CIS Work area maintenance.

3. Stormwater best management practices.

4. Sampling, characterizing, testing, and profiling associated with CIS and potential CIS disposal.

5. Sampling, characterizing, and disposing of Contractor’s waste materials and decontamination of Contractor’s equipment and disposal of decontamination wash water associated with CIS and potential CIS excavating, stockpiling, and disposal.

6. Loading, hauling, and unloading of soil to and from excavation and stockpile sites.

7. Disposing of Work and staging area materials.

8. Permits.

9. Documentation.

B. Measurement and Payment:

1. Unforeseen Contaminated and Hazardous Soil and Groundwater (Allowance): Payment shall be made on either a negotiated lump sum basis or a time-and-materials basis for any portion of Work described in this Section that is authorized in writing by Engineer.

2. Quantities of disposed CIS shall be measured by the tonnage shown on weight tickets from the disposal or recycling site.

    a. Excavate, Stockpile, and Dispose of California Hazardous Waste Soil (Non-RCRA): The quantity of California hazardous waste soil material excavated, transported to CIS stockpile site, stockpiled, characterized, hauled away, and disposed of off Project Site at a Class I lined landfill facility that accepts California hazardous waste in conformance with REGULATORY REQUIREMENTS Section shall be included in the bid item's unit price per ton for disposed material. Payment shall be based on tonnage tickets from disposal facility accompanied by waste manifest signed by receiving disposal facility. Payment shall be made under the Excavate, Stockpile, and Dispose of California Hazardous Waste Soil (Non-RCRA) bid item of Bid Proposal Line Items.

    b. Excavate, Stockpile, and Dispose of or Recycle Contaminated/Non-Hazardous Waste Soil: The quantity of contaminated non-hazardous waste soil material excavated, transported to CIS stockpile site, stockpiled, characterized, hauled away, and recycled or disposed of off Project Site at a Class III landfill or thermal desorption recycling facility in conformance with REGULATORY REQUIREMENTS Section. Payment shall be based on tonnage tickets from disposal facility accompanied by waste manifest signed by receiving disposal facility. Payment shall be made under the Excavate, Stockpile, and Dispose of or Recycle Contaminated/Non-Hazardous Waste Soil bid item of Bid Proposal Line Items.

3. Cubic yard quantities of potential CIS approved by Engineer for use as fill shall be determined by Engineer prior to placing the material as fill.

4. Quantities of leachate and contaminated stormwater liquids shall be measured by the number of gallons shown on the tickets from the disposal or recycling facility. Quantities shall be paid for under 1 or more of the following contingency bid items based upon Contractor's characterization of liquids approved by Engineer.

5. If CIS or potential CIS is excavated beyond the limits set by Engineer, associated costs for excavation, stockpiling, loading, transporting, and disposing of such CIS or potential CIS shall be borne by Contractor.

6. CIS and potential CIS payable quantities are subject to reduction if improperly covered stockpiles are exposed to rainfall, wind erosion, and blowing wind which could result in a public health problem.

1.4 REFERENCES

A. 8 CCR 5192 - Hazardous Waste Operations and Emergency Response.

B. 22 CCR Division 4.5 - Environmental Health Standards for the Management of Hazardous Waste.

C. 29 CFR 1910 - Occupational Safety and Health Standards.

D. 40 CFR - Protection of Environment.

E. 49 CFR - Transportation.

1.5 ABBREVIATIONS

A. HAZWOPER: Hazardous Waste Operations and Emergency Response

B. PCB: Polychlorinated biphenyl

C. RCRA: Resource Conservation and Recovery Act

D. TSCA: Toxic Substances Control Act

1.6 SUBMITTALS

A. Submit the following to Engineer prior to starting Project excavation or earthwork:

1. Contractor’s qualifications for handling and disposing of CIS, environmental sampling, sample collection and handling, sample preservation and storage, decontamination, and chain of custody procedures including applicable certificates, licenses, personnel training records, and HAZWOPER training certificates (including current 8-hour annual refresher certificates, if applicable) for each person working on Project Site.

2. Credentials of project manager and Project Site superintendent or foreperson for excavating, stockpiling, and disposing of CIS.

3. Sketch of stockpile design including foundation material with method of protecting liner against liner equipment damage, liner thickness, berm materials and height, and spacing of toe of stockpile to berm, cover material and thickness, and sand bag layout. The design and construction of the containment area shall be in conformance with regulatory requirements.

B. Submit the following to Engineer prior to starting potential CIS excavating and stockpiling Work:

1. Sketch of proposed location(s) on Project Site of temporary storage cells showing also distances to existing storm drain catch basins and the harbor pier head or shoreline. Show location of storage tanks for leachate and stormwater pumping.

2. Proposed Project Site Specific Safety and Health Plan in conformance with REGULATORY REQUIREMENTS Section.

3. Method for equipment decontamination after completion of potential CIS and CIS Work. Include structural best management practices (BMPs) such as rumble plates and bermed wash down area. Refer to REGULATORY REQUIREMENTS Section, Construction General Stormwater Permit and Stormwater Pollution Prevention Plan (SWPPP) Article for more information. Include wheel washer locations at stockpile and excavation sites.

4. Sampling procedure, characterization, testing, and profiling plan for CIS and potential CIS.

5. Sampling procedure and characterization plan for leachate liquids and name of independent test laboratory.

6. Submit BMPs for containing CIS and wash water within staging area.

7. Method for maintenance of separate stockpile sites for each excavation site.

C. Submit to Engineer during excavating and stockpiling:

1. Documentation of daily potential CIS quantities excavated and CIS quantities stockpiled.

   a. Laboratory test reports associated with any samples collected at Project Site within 48 hours of receipt of final copies from the laboratory.

   b. Records of daily calibration and direct readings for instrumentation maintained by Contractor. Submit daily to Engineer.

D. Submit to Engineer prior to loading and transporting CIS:

1. Name of proposed disposal or recycling facility.

    a. Depending upon the deposition location, approval from Los Angeles Regional Water Quality Control Board (LARWQCB) may be necessary.

2. Manifest forms prior to initiating transportation of CIS in conformance with Disposal, Acceptance, and Manifest Requirements Article of this Section.

3. Copies of information supplied to the disposal or recycling facility for the purpose of securing acceptance of the waste material.

    a. Provide final analytical characterization information. Draft data is not acceptable.

4. Waste acceptance pre-approval documentation received from the disposal or recycling facility(s).

5. Results of characterization of liquids collected from behind stockpile berms and from potential CIS excavation locations.

6. Results of characterization of waste material generated during decontamination of equipment.

E. Submit to Engineer during disposal or recycling of CIS:

1. Waste acceptance documentation received from the disposal or recycling facility (e.g., weight tickets, manifests, certificate of destruction or reuse).

F. Submit the following to Engineer after Work is complete:

1. Provide as-built drawings of excavation areas including volume estimates and global positioning system (GPS) location information.

G. Submit upon Engineer’s request:

1. Copy of State of California Contractor’s license with hazardous substance removal certification required to excavate, stockpile, and dispose of CIS.

2. Copy of the disposal or recycling facility permit with applicable limits and conditions.

1.7 QUALIFICATIONS

A. Project Site superintendent or foreperson overseeing Work of this Section shall have not less than 5 years experience in excavating, stockpiling, loading, transporting, and disposing of CIS.

B. Work associated with CIS shall be done under the direct supervision of a State of California registered geologist or professional engineer who has at least 5 years of experience in overseeing CIS operation.

C. Contractor shall have and maintain plan, programs, training, and medical surveillance requirements under 29 CFR 1910 and 8 CCR 5192. Prepare and implement a Project Site Specific Safety and Health Plan for Contractor employees.

D. Personnel performing Work at Project Site under this Section shall be 40 hour Occupational Safety and Health Administration (OSHA) health and safety trained, complete with 8-hour annual refresher, supervisor training, respirator fit testing, and other training and certifications required under 29 CFR 1910.

1.8 SEQUENCE OF ACTIVITIES

A. Submit to Engineer stockpile design and credentials prior to earthwork and trenching Work.

B. Notify Engineer at least 2 working days before excavation, stockpile, and sampling activities.

C. Notify Engineer in conformance with this Section and REGULATORY REQUIREMENTS Section of unexpected discovery of potential CIS. Basis of identification:

1. Discolored soil

2. Odoriferous soil

D. Confirm existence of CIS or potential CIS with a photo ionization detector (PID) or other devices and tests and determine approximate limits of CIS or potential CIS excavation.

1. Notify Engineer and adjust limits during course of CIS or potential CIS excavation based on periodic Project Site inspections.

E. Engineer authorizes Contractor to excavate, stockpile, and dispose of CIS. Contractor shall not start CIS or potential CIS excavation without Engineer’s written authorization.

F. Contractor excavates CIS or potential CIS and places in stockpiles conforming to this Section and located in storage cells within staging area location approved by Engineer.

G. After each storage cell is filled, Contractor samples, characterizes, tests, and profiles material in stockpiles and provides information to Engineer.

1. Contractor samples and characterizes leachates.

2. Sample frequency for potential re-use soil to be used as fill shall be in conformance with Paragraph 3.4 A.4 of EARTHWORK Section.

H. Contractor continues excavating and stockpiling CIS or potential CIS in accordance with Drawings until Engineer tells Contractor that CIS or potential CIS excavation is complete.

I. Contractor obtains Engineer's approval of disposal or recycling facility location.

J. Contractor disposes of CIS at approved off-site disposal location.

K. Contractor returns approved soil to Project Site as fill or disposes as directed by Engineer.

1.9 WASTE DISPOSAL SERVICE PROVIDERS

A. The following disposal facilities are acceptable to Department at the time of bid. After Contract is awarded, Contractor may propose additional disposal facilities but Department reserves the exclusive right to reject any proposed facilities for any reason at its sole discretion.

1. RCRA Hazardous and TSCA Waste for Landfill or Treatment:

a. Chemical Waste Management - Kettleman Hills, Kettleman City, California

b. Clean Harbors Buttonwillow, LLC, Buttonwillow, California (very limited TSCA)

c. US Ecology Nevada, Beatty, Nevada

2. Non-RCRA Hazardous (California Haz) Waste for Landfill:

    a. Chemical Waste Management - Kettleman Hills, Kettleman City, California

    b. Clean Harbors Buttonwillow, LLC, Buttonwillow, California

    c. US Ecology Nevada, Beatty, Nevada

3. Non-Hazardous Contaminated Waste for Landfill:

    a. Simi Valley Landfill - Waste Management, Simi Valley, California

    b. Sunshine Canyon Landfill - Republic Services, Sylmar, California

4. Non-Hazardous Contaminated Waste for Thermal Desorption Recycling (non-hazardous TPH contaminated soil):

    a. Soil Safe, Inc., Adelanto, California

5. Treated Weathered Wood Waste (railroad ties, etc.)

    a. Simi Valley Landfill - Waste Management, Simi Valley, California

    b. Sunshine Canyon Landfill - Republic Services, Sylmar, California

6. RCRA Hazardous Waste Liquid, Non-RCRA (California Haz) Waste Liquid, and/or Non-Hazardous Waste Liquid:

    a. World Oil Recycling, Compton, California

    b. Clean Harbors, Wilmington, California

## PART 2 - PRODUCTS

### 2.1 DESIGN REQUIREMENTS

A. Design staging area as follows:

1. Staging Area:

    a. Locate on Project Site as far as possible from storm drain catch basins and from pierhead and harbor shoreline.

    b. Locate upon existing pavement if sufficient area is available.

2. Enclose staging area perimeter with 8 foot high temporary chain link fence. Locate storage cells within fenced area. Each cell shall be capable of containing 1 potential CIS or CIS stockpile.

3. Show location of storage tank for leachate and stormwater retained in CIS excavation.

4. Include perimeter berm surrounding entire staging area in addition to berms surrounding each stockpile.

B. Design stockpile system based on materials and equipment specified in PART 2 of this Section as minimum requirements. Adjust according to results of Engineer's characterization if required. Address the following additional considerations:

1. Foundation: Where staging area must be located on dirt grade, design protection against equipment damage to liners through protective layers inserted above liners.

2. Liners: Design to prevent cross-contamination of native soil beneath stockpile and to seal berm from migration of leachate and stormwater run off from covered stockpile.

3. Berm: Design to retain leachate from stockpile and stormwater.

a. If soil from Project Site are proposed for use in berm construction, do not use potential CIS or CIS.

4. Covers: Design to prevent volatile organic compound (VOC) emissions, rain infiltration, and to be resistant to both wind and VOC emissions damage.

## 2.2 MATERIALS

A. Sandbags:

1. Fabricate from woven, ultraviolet-resistant materials that are sufficiently close knit to prevent fines from migrating out through the bag, with bags tied tightly closed.

a. Burlap bags, if used, shall be lined with plastic.

b. Tires and lined paper bags shall not be used.

2. Sand shall be non-CIS, 100 percent passing No. 8 sieve.

3. Each bag shall weigh 40 to 60 pounds when filled.

B. Storage Cell Foundation:

1. Existing asphalt concrete or concrete pavement.

2. Bare dirt grade condition: Protection to liner shall be minimum, 2 inches sand on 8 ounce per square yard geotextile over liner.

C. Liners: 60 mil high density polyethylene (HDPE), minimum.

D. Berm: Minimum height: 12 inches.

E. Covers: 18 mil polyolefin minimum.

F. Truck Bed Liners: 3 mil polyethylene, minimum.

2.3 EQUIPMENT

A. Provide and maintain equipment, including health and safety monitoring equipment, dust monitoring equipment, and emission control equipment, necessary to complete this Work scope.

B. Leachate and stormwater collection and storage:

1. Minimum storage tank capacity shall be 550 gallons.

a. Tanks shall have sample ports and minimum 2-inch diameter drain valves to facilitate characterization and disposal of accumulated liquid.

PART 3 – EXECUTION

3.1 INSTALLATION - GENERAL

A. Contractor shall adequately protect its workers and subcontractors from exposure to CIS and potential CIS.

B. Use a water truck for dust control during CIS and potential CIS excavating, stockpiling, and loading activities.

C. Provide hazardous material identification information to personnel involved in equipment handling, shipping, and disposing of potential CIS and CIS.

D. Use excavating, handling, and loading methods and equipment that minimize disturbance to CIS and potential CIS and to areas beyond the limits of CIS and potential CIS excavation Work.

E. Obtain and comply with applicable SCAQMD Permits and Rules. Refer to REGULATORY REQUIREMENTS Section.

F. Material or soil that become contaminated as a result of Contractor's negligent operations shall be removed and recycled or disposed of at no additional cost to Department.

G. CIS and potential CIS excavating, loading, and hauling equipment shall be decontaminated prior to leaving immediate loading area or Project Site for excavation of non-CIS in conformance with method approved by Engineer.

1. Waste materials generated during decontamination of equipment shall be recycled and disposed of off Department property in conformance with local, state, and federal regulations and guidelines.

2. Decontamination records shall be maintained for TSCA-regulated wastes in conformance with 40 CFR.

3.2 SOIL EXCAVATION

A. Segregate potential CIS from non-CIS and place excavated potential CIS in storage cells.

1. Exercise caution during handling and transporting of materials so as not to cross-contaminate surrounding areas.

2. Coordinate with Engineer to obtain characterization and determination of appropriate recycling or disposal options in conformance with local, state, and federal regulations.

3. Place soil confirmed by Engineer to be CIS in different storage cell in staging area than potential CIS.

B. Notify Engineer immediately in the event that potential CIS is encountered outside the approximate limits previously identified. Segregate suspicious potential CIS in these areas from non-CIS.

C. Materials generated from the demolition of existing structures, i.e. concrete, asphalt, piping, steel or wood framing and the like, shall be decontaminated, if necessary, prior to recycling or disposal. Such material is not considered CIS and shall be segregated from potential CIS during performance of Work. Refer to SELECTIVE SITE DEMOLITION and REGULATORY REQUIREMENTS Sections for additional information.

D. Stop Work and notify Engineer if free product liquids are encountered during excavation of potential CIS or if groundwater is encountered in a known CIS area.

3.3 SOIL STAGING AND STOCKPILING

A. Construct storage cell(s) for CIS or potential CIS at the staging area location(s) within Project Site limits approved by Engineer.

1. Store excavated CIS or potential CIS in temporary storage cell(s) for 30 days, maximum, prior to transporting to disposal or recycling facility.

2. Create separate storage cells for each distinct area within Project Site where CIS or potential CIS was discovered. Do not mix CIS or potential CIS from separate discovery areas or previously identified CIS areas.

B. The purpose of the temporary storage cell(s) shall be to:

1. Allow for Department characterization of potential CIS as well as to provide a mechanism to reduce or eliminate air and stormwater pollution from the stockpiles.

2. Prevent CIS or potential CIS from encountering non-CIS.

3. Prevent migration of liquid from surrounding areas into CIS or potential CIS and CIS.

4. Prevent migration of liquid and air emissions from CIS or potential CIS to the surrounding areas.

C. Storage Cell Construction:

1. Install temporary chain link fencing and entrance gates at the perimeter of staging area to prevent unauthorized entry. Install signs on fencing and entrance gate identifying the contents of the temporary storage cells and Contractor’s emergency telephone numbers.

2. Storage cell foundation shall consist of existing asphalt concrete or concrete pavement. Obtain Engineer's approval of foundation design for stockpile on exposed dirt grade prior to constructing foundation.

3. Construct perimeter barrier berm around entire staging area.

4. Install temporary plastic liner to ensure that CIS and potential CIS does not contact surrounding materials.

    a. For bare dirt conditions, remove rocks and other sharp objects greater than 3/4 inch in diameter from dirt prior to placing liners.

    b. For bare dirt conditions, install sand and geotextile or other membrane as approved by Engineer to protect liner from damage.

    c. Engineer reserves the right to take samples, beneath Contractor's proposed staging area location before and after creation of stockpiles to verify that adjacent grade has not been cross-contaminated.

5. Install a berm around each of the storage cell(s) sufficient to contain soil, sediment, and liquid, and to prevent stormwater runoff from flowing into or away from stockpiles.

    a. Extend liner up and over inside and outside faces of berm to prevent migration of liquids under the berm.

    b. Anchor berm and liner with sandbags.

6. Do not overfill cells with CIS and potential CIS. Maintain minimum of 18 inches from toe of stockpile to inside edge of berm.

7. Keep stockpiles covered with plastic to prevent odors and dust emissions in conformance with applicable local, state, and federal regulations and guidelines.

    a. Lap plastic to prevent entrance of stormwater into stockpile.

    b. Remove and replace stockpile covers to allow Engineer access upon request of Engineer.

    c. Remove stockpile covers to allow Engineer access for sampling upon request of Engineer. Replace covers after Engineer's sampling is complete.

8. Anchorage: Secure berm and liner with sandbags. Secure cover from wind uplift with sandbags regularly spaced from top to bottom of stockpile suspended by ropes or by other method approved by Engineer from top of stockpile. Secure edges of liner and cover. Remove and replace broken sandbags immediately.

D. Install BMPs approved by Engineer and use decontamination practices that prevent potential CIS from leaving the staging area.

1. Inspect vehicles prior to leaving the staging area to ensure that no potential CIS adheres to the wheels or undercarriage of equipment.

E. Inspect stockpiles on a daily basis to verify that stockpiles remain covered in order to prevent odorous and dust emissions in conformance with the terms of SCAQMD permits and other applicable local, state, and federal regulations. Verify emission levels by daily photo ionization detector (PID) monitoring. Replace covers whenever emissions exceed permit requirements or when VOC emission damage or other damage becomes evident.

F. Repair or replace perimeter controls, liners, or covers as needed, or as directed by Engineer to keep them functioning properly.

G. Remove sediment and soil coming from stockpile when accumulation reaches 1/3 of the perimeter berm height.

3.4 AIR EMISSION MONITORING

A. Air monitoring shall comply with local, state, and federal regulations and guidelines.

B. Monitor air quality continuously during excavation operations at potential CIS and CIS locations.

C. Provide field screening and monitoring equipment to monitor for:

1. Worker safety

2. Air monitoring permit requirements

D. In conformance with SCAQMD Rule 1166, use a PID, capable of detecting volatile organic vapors to a minimum of 1 part per million (ppm), to assess potential soil contamination levels. Soil with PID readings of 50 ppm or greater (measured at a distance of no more than 3 inches from the surface of the soil material) shall be deemed VOC-impacted soil and shall be excavated and managed in conformance with this Section.

E. Conform to requirements of SCAQMD Rule 1466. Refer also to REGULATORY REQUIREMENTS Section regarding Rule 1466.

3.5 STORMWATER CONTROL

A. Control perimeter of CIS and potential CIS excavations to prevent stormwater runoff from flowing into or out of excavated areas.

B. Implement structural stormwater best management practices (BMPs) to divert flows from exposed CIS and potential CIS, temporarily store flows, or otherwise prevent runoff and the discharge of pollutants from CIS and potential CIS excavation areas.

1. Refer to Construction Stormwater Pollution Control and Construction General Stormwater Permit and Stormwater Pollution Prevention Plan (SWPPP) Articles of REGULATORY REQUIREMENTS Section for additional BMP information.

2. Remove accumulated stormwater from potential CIS excavation areas in conformance with Leachate and Stormwater Handling Article of this Section.

3.6 LEACHATE AND STORMWATER HANDLING

A. Remove, store, sample, characterize, and recycle or dispose of stormwater that enters any excavation containing CIS and potential CIS as well as leachate and stormwater collected behind stockpile berms.

B. Construct collection sumps to facilitate removal of any accumulated stormwater and liquid leachate between toe of stockpile and inside edge of perimeter berms. Locate collection sumps at the low point between each berm and stockpile.

C. Construct collection sump at low point of CIS and potential CIS excavation locations.

D. Install transfer pumps in each of the collection sumps and connect piping to temporary storage tank(s) for transfer of accumulated liquid.

E. Use vacuum truck to collect leachate from stockpiles, stormwater accumulated behind stockpile berms, in potential CIS and CIS excavations, and from temporary storage tanks.

1. Pump accumulated leachate and stormwater weekly or as directed by Engineer.

F. Contractor shall obtain characterization of liquids.

G. Dispose or recycle liquids at location approved by Engineer.

3.7 BACKFILL

A. Soil determined by Engineer to be non-CIS may be considered for reuse within Project Site limits where fill is required. Refer to EARTHWORK Section for information on import fill and excavated soil to be re-used as fill.

B. Potential CIS and CIS shall not be used as backfill and shall be properly recycled or disposed of at a disposal facility approved by Engineer.

C. Under no circumstances shall Contractor blend or mix excavated potential CIS or CIS with other soil or material. Do not add potential CIS or CIS to characterized stockpiles.

3.8 DISPOSAL, ACCEPTANCE, AND MANIFEST REQUIREMENTS

A. Classification of waste materials shall be in conformance with 40 CFR and 22 CCR Division 4.5.

B. Obtain written approval from Engineer on the acceptability of the proposed disposal or recycling facility prior to transporting CIS. Depending upon the facility, approval from LARWQCB may be necessary.

C. Upon receipt of written approval from Engineer and a minimum of 2 working days prior to initiation of soil loading, transporting, and disposing activities, prepare manifests designating the recycling or disposal facility and properly describe the waste in conformance with 49 CFR or 22 CCR Division 4.5 (whichever is applicable) for Engineer's review.

1. Engineer shall notify Contractor of errors or inadequacies, if any.

2. Engineer shall designate a representative to be present during soil loading and transporting activities in order to sign the manifests.

D. Department of Toxic Substances Control (DTSC) Form 8022A/Environmental Protection Agency Form 8700-22 (California Uniform Hazardous Waste Manifest) is required for manifesting of hazardous waste, unless the receiving state requires otherwise.

1. Non-hazardous wastes shall be manifested using a non-hazardous waste form. These are usually supplied by the receiving recycling or disposal facility.

E. Dispose of CIS in conformance with applicable bid item of Bid Proposal Line Items.

F. Dispose of soil transported to the temporary storage cell(s) that is determined by Engineer not to be CIS at facility approved by Engineer.

3.9 SOIL TRANSPORTATION REQUIREMENTS

A. Select transporter with a current DTSC registration certificate, current Certificate of Compliance for vehicles and containers, adequate insurance coverage, and applicable Department of Transportation and Public Utilities Commission licenses.

B. Comply with Department of Transportation requirements for packaging, labeling, and marking to ensure that the transport vehicles are correctly placarded.

C. Cover transported materials appropriately to minimize loss of material during transportation due to leaking, spilling, falling, or blowing in conformance with REGULATORY REQUIREMENTS Section.

D. Transport soil off-site with no free liquids to avoid spillage on roads. Beds of trucks transporting CIS shall be lined and covered.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.

B. Openings for other Work.

C. Form accessories.

D. Form stripping.

E. For Work shown on Drawing No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

1.2 RELATED SECTIONS

A. Section 03 20 00 - Concrete Reinforcing

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires concrete forming and accessories.

1.4 REFERENCES

A. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials.

B. ACI SPEC-301 - Specifications for Concrete Construction.

C. PS 1 - Structural Plywood.

1.5 SUBMITTALS

A. Product Data: Provide data on void form materials and installation requirements.

B. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

C. Permanent Insulated Foam Panel Formwork shop drawings: Include calculations or selections from manufacturer's prescriptive design tables that indicate compliance with applicable building code and manufacturer's requirements.

1.6 QUALITY ASSURANCE

A. Designer Qualifications: Design formwork under direct supervision of a civil or structural engineer experienced in design of concrete formwork and licensed in the State of California.

B. Maintain 1 copy of each installation standard on site throughout the duration of concrete Work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect plastic foam products from damage and exposure to sunlight.

PART 2 - PRODUCTS

2.1 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete Work.

B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.

C. Comply with City of Los Angeles Building Code with respect to design, fabrication, erection, and removal of formwork.

2.2 WOOD FORM MATERIALS

A. Softwood Plywood: PS 1, B-B High Density Concrete Form Overlay, Class I.

B. Lumber: Douglas fir species; No. 2 grade; with grade stamp clearly visible.

2.3 REMOVABLE PREFABRICATED FORMS

A. Manufacturers:

1. Alabama Metal Industries Corporation: www.amico-online.com.

2. Molded Fiber Glass Construction Products Co: www.mfgcp.com.

B. Preformed Steel Forms: Minimum 16 gage, 0.0598 inch thick, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

2.4 FORMWORK ACCESSORIES

A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface.

B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.

1. Composition: Colorless reactive, mineral oil-based, soy-based, or vegetable-oil based compound.

2. Do not use materials containing diesel oil or petroleum-based compounds.

3. VOC Content: In compliance with applicable local, State, and federal regulations.

C. Taper Tie Hole Plug: Mechanical device for plugging tie holes; anchors optional flush or recessed grout.

1. Products:

a. Dayton Superior Corporation; A58 Sure Plug: {HL#18744273}

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in conformance with requirements of ACI SPEC-301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval before framing openings in structural members that are not indicated on Drawings.

F. Coordinate this Section with other Sections of Work that require attachment of components to formwork.

3.3 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in conformance with manufacturer's written instructions.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces shall receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.4 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete Work.

B. Locate and set in place items that shall be cast directly into concrete.

C. Coordinate with Work of other Sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

D. Install accessories in conformance with manufacturer's written instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints shall not be apparent in exposed concrete surfaces.

3.5 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

3.6 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI SPEC-117, unless otherwise indicated.

3.7 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that Work is in conformance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

3.8 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

C. Anchors and Dowels.

D. For Work shown on Drawings No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

1.2 RELATED SECTIONS

A. Section 03 10 00 - Concrete Forming and Accessories

B. Section 26 05 26 - Grounding and Bonding for Electrical Systems

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the corresponding Lump Sum Construction bid items of Bid Proposal Line Items for concrete reinforcing.

1.4 REFERENCES

A. ACI 318 - Building Code Requirements for Structural Concrete.

B. ACI SP-66 - ACI Detailing Manual.

C. ASTM A184/A184M - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement.

D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

E. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

F. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.

G. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.

H. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.

I. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars.

J. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.

K. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.

L. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

M. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars.

N. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars.

O. CRSI (DA4) - Manual of Standard Practice.

P. CRSI (P1) - Placing Reinforcing Bars, 10th Edition.

1.5 SUBMITTALS

A. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

B. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this Project meet or exceed specified requirements.

C. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.6 QUALITY ASSURANCE

A. Perform Work of this section in accordance with CRSI (DA4), CRSI (P1), ACI SP-66, ACI CODE-318, ASTM A184/A184M, and ACI SPEC-301.

1. Maintain 1 copy of each document on Project Site.

B. Provide Engineer with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection.

C. Welders' Certificates: Submit certifications for welders employed on Project, verifying AWS qualification and City of Los Angeles Department of Building and Safety certification within the previous 12 months.

PART 2 - PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars.

1. Unfinished.

B. Reinforcing Steel Mat: ASTM A704/A704M, using ASTM A615/A615M, Grade 40 (40,000 psi) steel bars or rods, unfinished.

C. Stirrup Steel: ASTM A1064/A1064M steel wire, unfinished.

D. Steel Welded Wire Reinforcement (WWR): Galvanized, deformed type; ASTM A1064/A1064M.

1. Form: Flat Sheets.

2. WWR Style: 4 x 8-W6 x W10.

E. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

3. Provide stainless steel components for placement within 1-1/2 inches of weathering surfaces.

2.2 RE-BAR SPLICING:

A. Coupler Systems: Mechanical devices for splicing reinforcing bars; capable of developing full steel reinforcing design strength in tension and compression.

1. Products:

a. Dayton Superior Corporation: www.daytonsuperior.com.

b. Other City of Los Angeles Department of Building and Safety approved or Caltrans approved coupler.

B. Dowel Bar Splicer with Dowel-Ins: Mechanical devices for connecting dowels; capable of developing full steel reinforcing design strength in tension and compression.

1. Products:

a. Dayton Superior Corporation: www.daytonsuperior.com

C. Taper Tie Hole Plug: Mechanical device for plugging tie holes; anchors optional flush or recessed grout.

1. Products:

a. Dayton Superior Corporation: www.daytonsuperior.com

D. Grout: Cementitious, non-metallic, non-shrink grout for use with manufacturer's grout sleeve reinforcing bar coupler system.

1. Products:

a. Dayton Superior Corporation: www.daytonsuperior.com

2.3 FABRICATION

A. Fabricate concrete reinforcing in conformance with CRSI (DA4) - Manual of Standard Practice.

B. Welding of reinforcement is not permitted.

C. Welding of reinforcement is permitted only with the specific approval of Engineer. Perform welding in conformance with AWS D1.4/D1.4M.

1. Epoxy Coated Reinforcement: Clean surfaces, weld and re-protect welded joint in conformance with CRSI (DA4).

D. Fabricate and handle epoxy-coated reinforcing in conformance with ASTM D3963/D3963M.

E. Locate reinforcing splices not indicated on Drawings at point of minimum stress.

1. Review locations of splices with Engineer.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Place, support, and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Maintain concrete cover around reinforcing as shown on structural drawings or in conformance with ACI 318.

E. Bond and ground reinforcement to requirements of GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS Section.

F. Anchors and Dowels:

1. Adhesive anchors and rebar dowels into existing concrete shall be installed with an injectable 2-component epoxy adhesive Hilti HIT-RE 500 V3 system as manufactured by Hilti, (800) 879-8000.

2. Adhesive anchors and rebar dowels shall be installed in conformance with the manufacturer's published installation instruction and International Code Council Evaluation Service ICC-ES ESR 2322, Installation Instructions.

3. Avoid damaging or cutting the exiting reinforcing bars. Locate existing rebar using non-hazardousm non destructive methods with accurate location tolerances (1/4 inch, plus or minus).

4. Contact Engineer prior to drilling if the proposed hole location interferes with the existing rebar.

5. If reinforcement is encountered during drilling before the specified depth is attained, contact Engineer to cerify if Engineer shall allow coring through the existing reinforcement. If not, drill a new hole in an area without interfering, existing reinforcement and adjacent to the rejected hole to the depth shown on Drawings. Contact Engineer to review final locations of drilled holes.

a. Patch hole in conformance with Repair of Surface Defects and Fissures Article of this Section.

6. Coordinate with Engineer for inspection during installation in conformance with ICC-ES ESR 2322.

3.2 FIELD QUALITY CONTROL

A. Department's Inspector shall inspect installed reinforcement for conformance to Contract Documents before concrete placement.

3.3 SCHEDULES

A. Reinforcement For Superstructure Framing Members: Deformed bars, unfinished.

B. Reinforcement For Foundation Wall Framing Members and Slab-on-Grade: Deformed bars and welded wire reinforcement, galvanized finish.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Lightweight Aggregate Fill

## 1.2 RELATED SECTIONS

A. Section 02 41 13 - Selective Site Demolition

B. Section 31 00 00 - Earthwork

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Paymant for this Work of this Section shall be paid under the Lightweight Aggregate bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. ASTM C29/C29M - Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate.

B. ASTM C88/C88M - Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.

C. ASTM C131/C131M - Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

D. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete.

E. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).

F. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).

G. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

## 1.5 SUBMITTALS

A. Contractor shall submit a work plan including but not limited to the following:

1. Product data sheets for lightweight aggregate and geotextiles.

2. Certificate of origin for lightweight aggregate and a written certification or manufacturer’s quality control data which displays that the products meet or exceed the values and frequency requirements specified herein.

3. Proposed equipment and procedures including staging and thickness of lifts as recommended by the manufacture.

4. Laboratory test data verifying compliance with specified gradation, moisture content, and compaction characteristics.

## 1.6 QUALITY ASSURANCE

A. Tests:

1. Where a testing laboratory is referred to in this Section, it is understood to mean City of Los Angeles Harbor Department Testing Laboratory (Test Lab) or a laboratory approved by Department. Tests performed by Test Lab shall be at no charge to Contractor. Contractor shall provide for sampling, testing, and certification except that which is indicated hereafter to be provided by Test Lab. Contractor provided testing laboratory shall be referred to in this Section as "independent testing laboratory." Costs of Contractor's sampling, testing, and certification shall be provided at Contractor's sole cost and expense.

2. Comply with the following to facilitate testing:

a. Provide and deliver to Test Lab representative samples of materials which require testing and are proposed to be used on Project, including but not limited to lightweight aggregate, woven geotextile, and non-woven filter fabric.

b. Furnish experienced technicians and equipment necessary to obtain and handle the samples at Project Site or at other locations where materials are located.

c. Advise Test Lab at least 72 hours in advance of the beginning of operations to allow time for completion of quality tests and for assignment of laboratory personnel.

d. When requested, furnish copies of test reports for each batch of lightweight aggregate delivered to Project Site, including gradation, moisture content, abrasion loss, soundness loss, maximum density, soil friction angle, and source certification.

e. Maintain a complete record of specimens taken, giving detailed location of each lift or area of fill represented.

B. Inspection:

1. Engineer reserves the right to inspect the manufacturing or processing facilities at any time during Work to ensure that the materials and workmanship are in conformance with Specifications. Inspection shall not relieve Contractor from full responsibility for the accuracy and character of Work in conformance with Specifications.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Lightweight Aggregate: The lightweight aggregate must be either manufactured materials or be naturally occurring. Wood fiber, blast furnace slag, fly ash, shredded tires, expanded polystyrene, crushed or ground glass or boiler slag are not allowed. The lightweight aggregate must have a proven record of durability.

1. Lightweight aggregates shall comply with the requirements of ASTM C330/C330M.

2. Organic content shall be less than 1.0 percent (weight of organic material to weight of total sample).

3. Lightweight aggregate materials gradation maximum size shall be 3/4 inch.

4. Soundness Loss (ASTM C88/C88M): Soundness loss shall be less than 10 percent for lightweight aggregates when subjected to 5 cycles of Sodium Sulfate. Alternatively, the soundness loss shall be less than 15 percent for lightweight aggregates when subjected to 5 cycles of Magnesium Sulfate.

5. Los Angeles Abrasion (ASTM C131/C131M): Abrasion loss shall be less than 40 percent.

6. In-place density and maximum compacted density: The in-place compacted total unit weight (including any absorbed water) shall be at least 40 pounds per cubic foot (pcf) and no greater than 65 pcf. The maximum compacted moist density shall not exceed 65 pcf, when tested in conformance with a modified version (One Point Proctor) of ASTM D698; the Standard Test shall be modified as follows: the aggregate sample shall be placed in a 0.5 cubic foot cylindrical container in the as-received moisture content, and the sample shall be placed in three equal layers and compacted by dropping a 5.5-pound rammer from 12 inches height 25 times on each layer.

7. The maximum oven dry loose bulk density when tested in conformance with ASTM C29/C29M shall be 60 pcf.

8. Angle of Internal Friction: The minimum angle of internal friction must be 40 degrees. The normal force used for the testing shall be 250, 1,000 and 2,000 pounds per square foot (psf).

B. Water: Water shall be potable and free of deleterious amounts of acids, alkali, salts, oils, and organic materials.

## PART 3 - EXECUTION

### 3.1 PREPARATION AND PLACEMENT

A. After the excavation (to the lines and grades shown on Drawings) is completed, the top 8 inches of the exposed subgrade should be scarified and compacted to a minimum 90 percent relative compaction based on the maximum density obtained using ASTM D1557. If soft fine-grained materials are found at the bottom of the excavation, an additional one foot of soft materials should be removed.

B. Woven geotextile (Mirafi 600X) shall be placed at the bottom of the excavation (interface of existing soil and lightweight aggregate fill). Non-woven filter fabric (Mirafi 160N) shall be placed on the sides of the excavation and on the top of the finish lightweight aggregate surface for separation between the native soils and the lightweight aggregate. The lightweight aggregate fill shall be completely enveloped in woven geotextile and filter fabric.

C. Lightweight aggregate fill shall be placed to the designated dimensions and grades shown on Drawings. Place the lightweight aggregate in uniform layers not exceeding 12 inches loose thickness. Compact the lightweight aggregate to at least 65 percent relative density. Adjust loose lift thickness as necessary to achieve the required minimum relative density. The compacted density of the lightweight aggregate shall range between 40 and 65 pcf.

D. Prior to placing each lift of lightweight aggregate fill, intermediate surfaces shall be free of soil debris and standing water.

E. Use static rolling with steel drum compactor weighing no more than 12 tons and minimum three passes or other suitable compactors that meet the requirements for the compaction of lightweight aggregate and without damaging underlying utility lines.

F. Construction vehicles and equipment shall not be operated on the exposed lightweight aggregate area other than equipment for placing and compacting lightweight aggregate. Low ground pressure equipment is recommended for placing and spreading the lightweight aggregate.

3.2 FIELD QUALITY CONTROL

A. In-place density tests shall be performed in conformance with ASTM D6938, at a frequency of one per 150 cubic yards or as directed. The nuclear gauge shall be calibrated to use for lightweight aggregate.

3.3 PROTECTION

A. Protect placed lightweight aggregate fill from contamination by other materials, standing water, or excessive drying.

B. Prevent erosion until the area is covered by overlaying materials.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Dry diamond grinding and polishing of concrete floor slabs. Work includes but is not limited to:

1. Preparation of concrete floor slabs to receive polished concrete finishing.

2. Sawcutting and filling of control joints.

3. Grinding and polishing of concrete floor slab.

4. Application of chemical resistant surface hardener.

5. Application of stain guard surface treatment.

6. Burnishing of concrete floor slab.

1.2 RELATED SECTIONS

A. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM C779/C779M - Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.

B. ASTM C805/C805M - Standard Test Method for Rebound Number of Hardened Concrete.

1.5 SUBMITTALS

A. Product Data:

1. Manufacturer’s specifications, test data, and other data required for each type of manufactured material and product indicated.

2. Concrete finishes describing products to be provided, manufacturer’s name, product name, and product line number for the specified materials proposed to be provided under this Section.

3. Manufacturer’s written installation or application procedures.

4. Technical data sheet giving descriptive data, curing time, and application requirements.

5. Safety data sheet (SDS) and other safety requirements for products provided under this Section.

B. Test Reports:

1. Provide certified test reports prepared by an independent testing laboratory approved by Engineer, confirming compliance with specified performance criteria.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Use experienced installers that are certified or approved installer by the concrete polishing system manufacturer. Provide letter of certification from the concrete finish manufacturer stating that installer is certified applicator of the polishing system and is familiar with proper procedures and installation requirements for the proper performance of Work of this Section.

B. Mock-ups:

1. Apply mock-ups of each type finish, to demonstrate typical joints, surface finish, color variation (as applicable), and standard of workmanship.

2. Build mock-ups approximately 30 square feet in the location as directed by Engineer.

3. Notify Engineer 7 days in advance of dates and times when mock-ups shall be constructed.

4. Obtain approval of mock-ups from Engineer prior to starting Work of this Section.

5. If Engineer determines that mock-ups do not meet requirements, demolish and remove mock-ups from Project Site if directed by Engineer and build another mock-up until approved by Engineer.

6. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed Work.

7. Approved mock-ups may become part of the completed Work if undisturbed at the time of substantial completion if approved by Engineer.

C. Pre-installation Meeting:

1. Conduct a pre-installation meeting at Project Site to verify Project requirements, manufacturer's installation instructions, and manufacturer warranty requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer labels indicating brand names and directions for storage, mixing with other components, and application.

B. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture and other detrimental effects.

C. Dispense concrete finish material from factory numbered and sealed containers. Maintain record of container number.

1.8 PROJECT CONDITIONS

A. Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting topping performance.

B. Concrete shall have a floor flatness rating of 50.

C. Concrete shall have a floor levelness rating of 50.

D. Concrete shall be cured a minimum of 28 days or as directed by the concrete finish manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. DiamondStone, (888) 817-8663

2.2 MATERIALS

A. Hardening and Sealing Agent: Stain Shield II

1. Performance Criteria:

a. Abrasion Resistance: Up to 400 percent increase in abrasion resistance in conformance with ASTM C779/C779M.

b. Impact Strength: Up to 21 percent impact strength in conformance with ASTM C805/C805M.

c. Weathering: No adverse effect to ultra violet and water spray.

d. Coefficient of Friction: Floor polished up to 200 phenolic shall meet or exceed Americans with Disabilities Act (ADA) standard for a safe walking surface when tested in a dry method.

e. Reflectivity: Up to 30 percent increase in reflectivity.

B. Joint Filler: High-performance, 100 percent solids, semi-rigid epoxy sealant, Diamond- EJF.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine concrete floor slab for conditions affecting performance of finish. Correct conditions that are found to be out of compliance with the requirements of this Section. Do not proceed until unsatisfactory conditions are corrected.

B. Floor slab shall be clean of materials, debris, and surface contaminants to ensure penetration of surface densifier.

C. Protect adjacent surfaces as required to prevent damage by the concrete polishing procedure.

D. Ensure floor slab is cured to accept polishing applications.

E. Saw-cut and fill control joints with the specified joint filler. Fill joints flush to the surface prior to start of polishing operations.

3.2 APPLICATION

A. Comply with concrete finish manufacturer’s written instructions and procedures.

B. Provide consistent finish in contiguous areas.

C. Re-polish areas not meeting specified gloss levels in accordance with the built mock-ups.

D. Finish edges of floor finish adjoining other materials in a clean and sharp manner.

E. Remove defects and re-polish defective areas.

F. Gloss Level: As noted on Drawings.

G. Finished floor surface shall have a coefficient of friction of not less than 0.60.

3.3 CLEANING

A. Keep premises clean and free of debris.

B. Remove spatter from adjoining surfaces, as necessary.

C. Dispose of materials in separate, closed containers in compliance with regulatory requirements.

3.4 PROTECTION

A. Protect finished Work until fully cured in conformance with manufacturer’s written instructions.

END OF SECTION

# PART 1 GENERAL

## 1.1 SECTION INCLUDES

A. Architectural precast monument sign base

B. Precast concrete wheelstop

## 1.2 RELATED SECTIONS

A. Section 03 20 00 - Concrete Reinforcing

B. Section 07 92 00 - Joint Sealants

C. Section 12 93 01 - Site Furnishings

D. Section 32 13 14 - Concrete for Exterior Improvements

E. Section 32 14 13 - Precast Concrete Unit Paving

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the corresponding Lump Sum Construction bid items of Bid Proposal Line Items.

## 1.4 REFERENCES

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary.

B. ACI SPEC-301 - Specifications for Concrete Construction.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

E. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

F. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric).

G. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

H. ASTM C150/C150M - Standard Specification for Portland Cement.

I. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.

J. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete.

K. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

L. ASTM C989/C989M - Standard Specification for Slag Cement for Use in Concrete and Mortars.

M. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.

N. AWS D1.1/D1.1M - Structural Welding Code - Steel.

O. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars.

P. IAS AC157 - Accreditation Criteria for Fabricator Inspection Programs for Reinforced and Precast/Prestressed Concrete.

Q. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.

R. PCI MNL-120 - PCI Design Handbook.

S. PCI MNL-122 - Architectural Precast Concrete.

T. PCI MNL-123 - Connections Manual: Design and Typical Details of Connections for Precast and Prestressed Concrete.

U. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene 1 week prior to commencing Work of this section.

1.6 SUBMITTALS

A. Product Data: Manufacturer's information on accessory products, including pigments, admixtures, inserts, plates, and the like.

B. Shop Drawings: Indicate layout, unit locations, configuration, unit identification marks, reinforcement, integral insulation, insulated panel system connectors, connection details, support items, location of lifting devices, dimensions, openings, and relationship to adjacent materials. Provide erection drawings.

1. Include details of mix designs.

2. Include structural design calculations.

C. Samples: Submit 2 samples of each color, illustrating surface finish, color and texture.

D. Fabricator's Qualification Statement: Provide documentation showing precast concrete fabricator is accredited under IAS AC157.

E. Sustainable Design Reporting: If any fly ash, ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix designs to replace Portland cement, submit the total volume of concrete, mix design(s) used showing the quantity of Portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used; use Material Content Form.

F. Maintenance Data: Provide surface cleaning instructions in conformance with Quality Assurance Article of this Section.

1.7 QUALITY ASSURANCE

A. Design Engineer Qualifications: Design precast concrete units under direct supervision of a professional structural engineer experienced in design of precast concrete and licensed in the State of California.

B. Fabricator Qualifications:

1. Firm having at least 2 years of documented experience in production of precast concrete of the type required.

2. Plant certified under Precast/Prestressed Concrete Institute Plant Certification Program; product group and category A1 - Architectural Precast Concrete.

3. Plant certified under Architectural Precast Association Plant Certification Program for production of architectural precast concrete.

4. Fabricator Qualifications: Precast concrete fabricator accredited by International Accreditation Service (IAS) conforming to IAS AC157.

C. Welder Qualifications: Qualified within previous 12 months in conformance with AWS D1.1/D1.1M and AWS D1.4/D1.4M and shall be certified with City of Los Angeles.

D. Copies of Documents at Project Site: Maintain at Project Site a copy of each referenced document that prescribes execution requirements.

1.8 MOCK-UP

A. Provide a full-size mock-up of each piece of precast, with lifting device, and attachment points, and finish in conformance with approved sample.

B. Locate where directed by Engineer.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Lift and support precast units only from support points.

B. Blocking and Lateral Support During Transport and Storage: Use materials that are clean, non-staining, and non-harmful to exposed surfaces. Provide temporary lateral support to prevent bowing and warping.

C. Protect units to prevent staining, chipping, or spalling of concrete.

D. Mark units with date of production in location that shall be concealed after installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Architectural Precast Concrete:

1. Any manufacturer holding a Precase Concrete Institute (PCI) Group A Plant Certification for the types of products specified; see www.pci.org.

2. Basis of design manufacturer shall be Quick Crete Products Corp. Website: www.quickcrete.com.

2.2 PRECAST UNITS

A. Precast Architectural Concrete Units: Comply with PCI MNL-120, PCI MNL-122, PCI MNL-123, PCI MNL-135 , and ACI CODE-318.

1. Concrete Face Mix: Minimum 5,000 pounds per square inch (psi), 28 day strength, air entrained to 5 to 7 percent; comply with ACI SPEC-301.

2. Design Loads: Static loads, anticipated dynamic loading, including positive and negative wind loads, thermal movement loads, and erection forces as defined by applicable City of Los Angeles Building Code.

3. Calculate structural properties of units in conformance with ACI CODE-318.

4. Other Cementitious Materials: Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with strength and appearance requirements.

5. Accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

6. Provide connections that accommodate building movement and thermal movement and adjust to misalignment of structure without unit distortion or damage.

B. Finish: C-Etch by Quickcrete

2.3 REINFORCEMENT

A. Comply with requirements of CONCRETE REINFORCING Section.

2.4 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.

B. Other Cementitious Materials:

1. Fly Ash or Natural Pozzolans: Comply with ASTM C618.

2. Ground Granulated Blast Furnace Slag: ASTM C989/C989M.

3. Silica Fume: Comply with ASTM C1240.

C. Fine and Coarse Structural Aggregates: ASTM C33/C33M.

D. Lightweight Structural Aggregate: ASTM C330/C330M.

E. Air Entrainment Admixture: ASTM C260/C260M.

2.5 FORM LINERS

A. Material: Glass fiber reinforced polyester, acrylonitrile butadiene styrene, polyvinyl chloride, polystyrene, or polyurethane.

## 2.6 SUPPORT DEVICES

A. Connecting and Support Devices; Anchors and Inserts: ASTM A36/A36M steel; hot-dip galvanized in conformance with ASTM A153/A153M.

1. Clean surfaces of rust, scale, grease, and foreign matter.

B. Bolts, Nuts, and Washers: ASTM A307 heavy hex bolts, Type A, hot-dip galvanized, with matching ASTM A563/A563M nuts and matching washers.

## 2.7 FABRICATION

A. Fabricate in conformance with PCI MNL-117 and PCI MNL-135.

B. Maintain plant records and quality control program during production of precast units. Make records available upon request.

C. Use rigid molds, constructed to maintain precast unit uniform in shape, size, and finish.

D. Use form liners in conformance with manufacturer's written instructions.

E. Place thin brick in form liner in conformance with manufacturer's written instructions. Mix bricks from several cartons for uniform distribution of color variations.

F. Maintain consistent quality during manufacture.

G. Fabricate connecting devices, plates, angles, items fit to steel framing members, inserts, bolts, and accessories. Fabricate to permit initial placement and final attachment.

H. Embed reinforcing steel, anchors, inserts plates, angles, and other cast-in items.

I. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.

J. Minor patching in plant is acceptable, providing structural adequacy and appearance of units is not impaired.

## 2.8 FABRICATION TOLERANCES

A. Conform to PCI MNL-117 and PCI MNL-135, except as specifically amended below.

2.9 SOURCE QUALITY CONTROL

A. Provide testing and analysis of concrete mix.

B. Take 1 air entrainment test cylinders for each set of exterior concrete test cylinders taken.

C. Take water absorption test in conformance with PCI MNL-117.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that building structure, anchors, devices, and openings are ready to receive Work of this Section.

3.2 PREPARATION

A. Provide for erection procedures and induced loads during erection. Maintain temporary bracing in place until final support is provided.

3.3 ERECTION

A. Erect units without damage to shape or finish. Replace or repair damaged panels.

B. Erect units level and plumb within allowable tolerances.

C. Align and maintain uniform horizontal and vertical joints as erection progresses.

D. When units require adjustment beyond design or tolerance criteria, discontinue affected work and notify Engineer.

E. Fasten units in place with mechanical connections.

3.4 TOLERANCES

A. Erect members level and plumb within allowable tolerances. Conform to PCI MNL-135, except as specifically amended below.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concrete unit masonry

B. Miscellaneous related materials

1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 05 50 00 - Metal Fabrications

C. Section 07 19 00 - Water Repellents

D. Section 08 11 13 - Hollow Metal Doors and Frames

E. Section 09 90 01 - Painting for Exterior Improvements

F. Section 09 96 23 - Graffiti-Resistant Coatings

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

B. ASTM C90 - Standard Specification for Dry-Cast Loadbearing Concrete Masonry Units.

C. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens).

D. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.

E. ASTM C150/C150M - Standard Specification for Portland Cement.

F. ASTM C1006/C1006M - Standard Test Method for Splitting Tensile Strength of Masonry Units.

G. ASTM C1019 - Standard Test Method for Sampling and Testing Grout for Masonry.

H. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.

I. ASTM D2287 - Standard Classification System and Basis for Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds.

J. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures.

K. City of Los Angeles Building Code:

Division 21 - Masonry

L. Concrete Masonry Association of California and Nevada

M. Reference Specifications (RS):

Section 300 - Earthwork

Subsection 300-3.3 - Foundation Material Treatment

1.5 SUBMITTALS

A. Submit to Engineer for approval manufacturer’s product data and samples of each concrete unit masonry before installing masonry Work.

1. Samples submitted shall be finished to match control sample (for example, sandblasting, waterproofing, graffiti resistant coating as required).

B. Submit test reports on concrete unit masonry from a qualified independent testing agency indicating compliance with ASTM C90 and the specified requirements.

1.6 QUALITY ASSURANCE

A. Sample Panel: Before installing concrete unit masonry, build 1 sample panel, using materials indicated for completed Work, to verify selections made under sample submittals and to demonstrate aesthetic effects. Sample panel shall be approximately 48 inches long by 72 inches high by full thickness.

1. Locate sample panel at location directed by Engineer.

2. Clean exposed faces of the panel with masonry cleaner recommended by the concrete unit masonry manufacturer.

3. Finish sample panel to the specified finishes.

4. Protect approved sample panel from the elements with weather-resistant membrane.

5. Maintain sample panel during construction in an undisturbed condition as a standard for judging completed Work.

6. Approval of sample panel is for color, texture, and blending of concrete unit masonry; relationship of mortar and sealant colors to concrete unit masonry colors; tooling of joints; aesthetic qualities of finished Work; and other material and construction qualities approved by Engineer in writing.

    a. Approval of sample panel does not constitute approval of deviations from Contract Documents contained in sample panel, unless such deviations are specifically approved by Engineer in writing.

B. Testing:

1. Department Testing Laboratory (Test Lab) shall perform the following tests:

    a. Slump Test: Slump test of grout during grout placement in conformance with ASTM C1019 and ASTM C143/C143M.

    b. Strength Tests:

        1) Concrete Unit Masonry: Tensile strength tests shall be performed in conformance with ASTM C1006/C1006M. Three units shall be tested for each 2,000 square feet, or fraction thereof, of wall area.

        2) Mortar: Compressive strength tests shall be performed in conformance with ASTM C109/C109M. Three cubes shall be tested for each 2,000 square feet, or fraction thereof, of wall area.

        3) Grout: Compressive strength tests shall be performed in conformance with ASTM C1019. Three square prisms shall be tested for each 2,000 square feet, or fraction thereof, of wall area.

2. Test Lab shall provide certificate of compliance for bottoms of footings and pads prior to placing reinforcing bar and concrete.

3. Advise Test Lab 72 hours in advance of the beginning of operations to allow time for completion of quality tests and for assignment of laboratory personnel.

4. Provide and deliver to Test Lab, representative samples of materials which require testing and are proposed to be used on Project (block, mortar, grout, and the like).

5. When requested, furnish copies of test reports of shipments of concrete to Engineer and Test Lab.

C. Construction tolerances for concrete unit masonry shall conform to TMS 402/602.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store units on platforms that allow circulation under units and protect against wetting. Damaged or stained units shall be rejected.

B. Deliver packaged miscellaneous materials in original containers with seals unbroken. Store in conformance with material manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 CONCRETE UNIT MASONRY

A. Hollow-load bearing concrete unit masonry Type I or II, Grade N, conforming to ASTM C90, f'm = 2,000 pounds per square inch, as manufactured by Angelus Block Company. Units shall have medium sandblast faces where noted on Drawings.

B. Concrete unit masonry modular size shall be 8 inches thick, as indicated on Drawings, by 8 inches high by 16 inches long.

2.2 MISCELLANEOUS RELATED MATERIALS

A. Reinforcing Steel: ASTM A615/A615M, Grade 60.

B. Portland Cement: ASTM C150/C150M, Type I or II, low alkali, with total amount of sodium potassium oxide in the cement not to exceed 0.6 percent when the aggregates contain opalescent silica or are reactive to alkalis.

C. Lime and Lime Putty: In conformance with City of Los Angeles Building Code.

D. Sand for Mortar: In conformance with City of Los Angeles Building Code.

E. Pea Gravel for Grout: Not more than 5 percent passing the No. 8 sieve, 100 percent passing the 3/8 inch sieve, in conformance with City of Los Angeles Building Code.

F. Ties and Anchors: Sheet metal and wire conforming to City of Los Angeles City Building Code.

G. Metal Tube Sleeves: Galvanized steel pipe having an inside diameter greater than applicable reinforcing bar for use at masonry wall expansion joints; length as indicated on Drawings.

H. Bonding Agent: Weld-Crete, as manufactured by Larsen Products Corporation (800) 633-6668.

I. Water for grout and mortar shall conform to requirements of City of Los Angeles Building Code Section 91.2404(b)11 from a source used for domestic purposes.

J. Preformed Control Joint Gaskets:

1. PVC: In conformance with ASTM D2287, Type PVC.

2. Rubber: In conformance with ASTM D2000, designation M2AA-805.

K. Control Joint Materials: Conform to requirements of TMS 402/602

2.3 MORTAR AND GROUT

A. Cement Lime Mortar: Conforming to City of Los Angeles Building Code, Type "S", as set forth in Table 2103.8(2); f'c = 1,800 pounds per square inch, with proper amount of water for a plastic workable mix.

1. Mortar color: Match concrete unit masonry and integrally colored as approved by Engineer.

2. Mixing time: At least 5 minutes.

3. Time of Use: Within 90 minutes after leaving mixer; any mixture not so used shall be discarded; retempering not permitted.

B. Grout: Conforming to City of Los Angeles Building Code. Grout shall be Masonry Grout 70/30, Type "S", f'c = 2,000 pounds per square inch as manufactured by Angelus Block Company. Use pea gravel in grout space where the least cell dimension is 4 inches or more.

1. Mixing: By machine for at least 5 minutes.

2. Time of Use: Within 90 minutes after leaving mixer; any mixture not so used shall be discarded; retempering not permitted.

2.4 WATER REPELLENT

A. As specified in WATER REPELLENTS Section.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Excavate footings in conformance with RS Subsection 300-3.3, except that compaction shall conform to BASIC SITE MATERIALS AND METHODS Section.

2. Roughen the top of concrete footing and clean off foreign matter and laitance by sandblasting prior to laying concrete unit masonry.

3. Draw blocks from more than one pallet at a time during installation.

4. Keep exposed surfaces clean and free of mortar and grout droppings during and after laying until accepted by Engineer.

5. Construct block Work in conformance with best standards of concrete unit masonry workmanship established by Concrete Masonry Association of California and Nevada.

6. Coordinate placement of reinforcing with architectural sheets to ensure no conflicts with fixtures.

B. Construction:

1. Lay concrete unit masonry true and plumb, in even plane surfaces, with level courses and straight, uniform, concave tooled joints.

2. Lay concrete unit masonry symmetrically.

3. Construct masonry with uniform and symmetrical joints, 3/8 inch wide both horizontally and vertically on the finished side of the wall as necessary for the specified concrete unit masonry and mortar joints except as indicated on Drawings.

4. Anchor masonry to abutting construction with approved ties into concrete or as otherwise indicated on Drawings.

5. Set required anchors, bolts, piping, sleeves, rough hardware and other inserts into masonry as concrete unit masonry are laid.

6. Use 3/4 inch diameter concave tool to make joint recessed to 1/2 inch. Joints shall be uniformly concave without waves or dips.

7. Curing Masonry in Hot or Windy Conditions: Use a fog spray to dampen surfaces. Spray shall not flow on surfaces or into joints.

8. Coring holes for pipes or conduit in completed masonry walls shall be made with a coring machine.

C. Grouting:

1. Reinforcing steel shall be secured in place, inspected, and approved before grouting starts.

2. Cells shall be grouted solid unless noted otherwise on Drawings. Pours shall be stopped 1 1/2 inches below a top of a course to form a key at pour joints.

3. Comply with applicable requirements of TMS 402/602 in grouting.

4. Grout shall be placed in lifts not to exceed 4 feet, with a waiting period of 1 hour between lifts. The full height of the wall or masonry section shall be placed in 1 day. Alternate High-Lift Grout may be used if approved by Engineer and all codes requirements are satisfied.

5. Rod or vibrate grout thoroughly the entire height of the pour when first placed to push grout into spaces. After the waiting period of an hour, place second lift and rod or vibrate the pour again to penetrate not more than half way into the first lift. Repeat this placing operation, waiting period, and consolidating technique until the top is reached. The top pour or lift shall likewise be reconsolidated after waiting period to allow excess water to be absorbed and escape.

## 3.2 CONCRETE UNIT MASONRY

A. Lay units in conformance with City of Los Angeles Building Code, Division 21.

B. Recesses per City of Los Angeles Building Code to be cut only upon approval of Engineer and as detailed on Drawings.

C. Expansion and Control Joints: Install wide flange control joint with neoprene compound edge for use in applicable wall thickness. Install over full height of wall where indicated on Drawings in conformance with manufacturer's written instructions. Install preformed control-joint gaskets designed to fit standard sash block.

D. On retaining walls, yard walls, and planter walls, provide a mortar cap unless shown otherwise on Drawings. Cap shall be tooled to drain.

3.3 EMBEDDED ITEMS

A. Install reglets, anchors, nailing strips, bolts, and other items in masonry walls as indicated on Drawings and as required for Work.

3.4 WEEP HOLES

A. Weep Holes in Retaining Walls, Planter Walls and Yard Walls: 32 inches on center and 2 inches high, above bed joints, typical.

B. Weep Holes in Veneer Walls and Cavity Walls: Install weep holes and vents at proper intervals at courses above grade, above flashing, and at any water stops over windows, doors, and beams.

3.5 CLEANING AND POINTING

A. During construction, remove mortar and grout droppings from concrete unit masonry surfaces with fiber brushes and water to prevent adhesion, and wash surfaces clean.

1. Care should be taken to remove mortar from the face of concrete unit masonry before it sets.

B. When mortar in the joints has slightly stiffened, prior to tooling, fill interstices and voids between units and the mortar and other materials as well as lime pin holes with mortar as Work progresses. Provide concave tooling of joints.

C. Completed concrete unit masonry Work:

1. After completion of jointing and tooling operations, clean concrete unit masonry surfaces of mortar stains, soil and spotting prior to acceptance of Work.

a. For stubborn mortar stains or smears, use a 3:1 solution of Sure Klean Burnished Custom Masonry Cleaner by Prosoco. Thoroughly wet walls before applying the cleaning solution and thoroughly rinse with clean water immediately after washing.

b. Where stains persist after cleaning, provide a light sandblast at Contractor's sole cost and expense. Use light sandblast to avoid damaging masonry surfaces and joints. Clean sandblasted surfaces by hosing down with water.

c. Contractor shall clean building surfaces meant to receive subsequent coatings of any type or kind. Surfaces shall be cleaned within 5 days of the completed sandblasting operation, and again just prior to the application of any coatings.

d. Apply water repellent over exterior concrete unit masonry in conformance with WATER REPELLENTS Section.

e. Apply graffiti resistant coating over exterior masonry to a minimum of finish height of CMU wall.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Non - structural architectural concrete masonry units.

B. Architectural concrete masonry single wythe units.

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

B. Section 07 60 00 - Flashing and Sheet Metal

C. Section 07 92 00 - Joint Sealants

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.

B. ANSI A118.5 - American National Standard Specifications for Chemical Resistant Furan Mortars and Grouts for Tile Installation.

C. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

D. ASTM C90 - Standard Specification for Dry-Cast Loadbearing Concrete Masonry Units.

E. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.

F. ASTM C150/C150M - Standard Specification for Portland Cement.

G. ASTM C270 - Standard Specification for Mortar for Unit Masonry.

H. ASTM C331/C331M - Standard Specification for Lightweight Aggregates for Concrete Masonry Units.

I. ASTM C595/C595M - Standard Specification for Blended Hydraulic Cements.

J. ASTM C744 - Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units.

K. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

L. ASTM C1019 - Standard Test Method for Sampling and Testing Grout for Masonry.

M. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms.

N. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.

O. ASTM D2287 - Standard Classification System and Basis for Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds.

P. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

Q. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures.

1.5 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used.

B. Preparation instructions and recommendations.

C. Color samples, facing samples, Quality Assurance test report copies, representative shapes.

D. Storage and handling requirements and recommendations.

E. Selection Samples: Submit 3 full size units of each type/color of exposed architectural concrete masonry unit for review of color and texture to verify compliance with products specified. Provide the maximum color and texture variation range expected in finished Work. Production orders may be released after submittals are approved.

F. Manufacturer's Certificates and Quality Assurance Test Reports: Certify products meet specified requirements. Quality Assurance Test Reports shall be provided as per batch design, not configuration.

## 1.6 DESIGN AND PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days:

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Table 1 and 2 inch of TMS 402/602.

## 1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Department shall engage a qualified independent testing agency to perform preconstruction testing. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's sole cost and expense.

B. Concrete Masonry Unit Test: For each batch type required, conforming to ASTM C140/C140M for compressive strength.

C. Mortar Test (Property Specification): For Type S and/or Type M required, conforming to ASTM C270.

D. Grout Test (Compressive Strength): For each mix required, conforming to ASTM C1019.

E. Epoxy Grout: Conformance to ANSI A118.3

## 1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum 10 years documented experience and a current member of good standing of the Concrete Masonry & Hardscapes Association (CMHA).

B. Installer Qualifications: Company specializing in performing Work of this section with minimum 5 years documented experience with projects of similar scope and complexity.

C. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on Project Site during phases of masonry Work while it is in progress.

D. Source Limitations: Provide each type of masonry unit from a single manufacturing source to ensure uniform texture and color for continuous and visually related items.

E. Mock-Up: Prior to starting masonry Work build sample wall panel(s) for Engineer's inspection and acceptance. Build panel(s) on a firm foundation, in location acceptable to Engineer. Panel(s) shall be L-shaped, with long side a minimum of 5 foot 4 inches long by 4 foot 0 inches high and with one corner return at least 4 foot 0 inches long. Construct sample panel(s) full thickness, installing wall reinforcement, anchors, ties and other required accessories. Provide special features as directed for control joints, weeps, etc. Panel(s) shall show color range and texture of masonry units, bond, mortar joints and workmanship to be expected for Project.

F. Clean one-half of each sample panel using approved masonry cleaning materials and methods to represent final cleaning. Remaining one-half to remain without final cleaning for comparison purposes.

G. Retain sample panels during construction as a standard for judging completed masonry Work. Do not alter, move, or destroy sample panels until Work is completed or removal is authorized.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver architectural concrete masonry units to Project Site on wood pallets.

B. Glazed units shall be palletized with each individual face protected, keep pallets dry.

C. Inspect architectural concrete masonry units upon delivery to ensure color match with required materials and accepted samples.

D. Stack masonry units in a dry place off the ground on pallets or a prepared plank platform. Method of stacking is acceptable. Protect with non-staining waterproof tarpaulin coverings arranged to allow air circulation around and above masonry units.

E. Exercise care in the storage, handling and installation of masonry units. Do not build soiled or damaged masonry units into Work.

1.10 SEQUENCING

A. Ensure that locating templates and other information required from others for built-in installation of products of this section are furnished in time to prevent interruption of construction progress.

1.11 PROJECT CONDITIONS

A. Follow hot weather and cold weather requirements in the masonry code and specifications, TMS 402/602.

B. Work in Progress:

1. Air temperature 40 degrees Fahrenheit (F) to 32 degrees F:

a. Heat sand or mixing water to produce mortar temperatures that match air temperature.

2. Air temperature 32 degrees F to 25 degrees F:

a. Heat sand and mixing water to produce mortar temperatures between 40 degrees F and 120 degrees F.

b. Maintain temperature of mortar on boards above freezing.

c. Installation in colder air temperatures shall require heat sources on the wall and the use of windbreaks or tents to create a controlled environment suitable for proper bonding and curing.

C. Completed Work and Work Not in Progress:

1. Mean daily air temperature of 40 degrees F to 32 degrees F: Protect masonry from rain and snow for 24 hours by covering with a weather-resistive membrane.

2. Mean daily air temperature of 32 degrees F to 25 degrees F: Cover masonry with a weather-resistive membrane for 24 hours.

3. Mean daily air temperature of 25 degrees F to 20 degrees F: Cover masonry with insulating blankets for 24 hours.

D. Hot Weather Procedures:

1. When ambient temperature exceeds 90 degrees F and wind exceeds 8 miles per hour:

2. Maintain temperature of mortar and grout between 70 degrees F and 120 degrees F.

a. Limit the spread of the mortar bed to 4 feet and place units within 1 minute of spreading mortar.

b. Control moisture evaporation in partially or newly completed walls by fog spraying with potable water, covering with opaque plastic or canvas or both.

E. Protection of Work in Progress:

1. Covering:

a. Cover tops of walls with a strong waterproof membrane at the end of each day or Work shutdown. Extend the waterproof membrane cover a minimum of 24 inches down the side of each wall.

b. Hold cover securely in place.

2. Load Application:

a. Do not apply uniform floor or roof loading for at least 12 hours after completing columns and walls.

b. Do not apply concentrated loads for at least 3 days after completing columns and walls.

3. Staining:

a. Prevent grout and mortar from staining the face of masonry.

b. Remove grout and mortar that comes in contact with masonry units immediately.

c. Protect sills, ledges and projections from mortar droppings.

d. Protect base of wall from rain-splashed mud and mortar splatter.

e. Turn scaffold boards on edge when Work is not in progress to lessen splattering.

F. Coordination: Coordinate Work to ensure top of wall is covered and remains covered until properly block openings are protected with coping or finishing system indicated on Drawings

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aggregate:

1. ASTM C33/C33M normal weight aggregate.

2. ASTM C331/C331M lightweight aggregate.

B. Cement: ASTM C150/C150M or ASTM C595/C595M, Type required. Color: White/Grey as required for use with the color specified.

C. Color Pigments: Lightfast, alkali-resistant, weather-resistant natural or synthetic iron oxides manufactured specifically for use in concrete masonry units.

2.2 ARCHITECTURAL CONCRETE MASONRY UNITS

A. Hollow Load Bearing Units: Provide unit type and size(s) indicated on Drawings:

1. Masonry units shall meet ASTM C90.

2. Color / Unit Weight: Integral color per Drawings.

3. Texture: Per Drawings.

4. Linear shrinkage: Not to exceed 0.065 percent per ASTM C90.

5. Unit Compressive Strength: Minimum net area compressive strength of 2,000 pounds per square inch (psi).

B. Special Shapes:

1. Provide closures, jamb units, headers, lintels, bond beams and other special shapes as indicated.

2. Provide standard manufactured sizes or cut full size units for fractional course height and lengths.

3. Glazed / Prefaced Units: Provide unit type and size(s) indicated on Drawings:

4. Masonry units shall meet ASTM C744.

5. Glaze color shall be: Per Drawings.

C. Glaze facing units have a 1/16 inch lip around perimeter of a standard C90 block.

1. Typical C90 8x16 block is 7 5/8 inch by 15 5/8 inch

2. Glaze unit is 7 3/4 inch by 15 3/4 inch

D. Surface Burning Characteristics of Facing: per ASTM E84:

1. Flame spread less than 25

2. Fuel contribution 0

3. Smoke density less than 50

4. Products of combustion considered non-toxic as determined by BRC 4690 (toxicity testing)

E. Provide standard manufactured sizes or cut full size units for fractional course height and lengths.

F. Manufacturer of Concrete Masonry Units:

1. ORCO Block & Hardscape, Contact: Erika Grover 909-966-9055 Email: Erika.Grover@orco.com, www.orco.com.

G. Manufacturer of Pre-Faced/Glazed Units:

1. Spectra-Glaze® II Units Manufactured by Texas Building Materials – Strawn, TX ORCO Block & Hardscape Contact: Erika Grover Contact: 909-966-9055, Email: Erika.Grover@orco.com.

H. Masonry Mortar:

1. Preblended Type S Mortar shall meet ASTM C1714.

a. Test in conformance with ASTM C270 Property Standards.

b. Manufacturer: ORCO blended Products.

I. Epoxy Grout shall be Laticrete Spectralock Pro premium grout and meet requirement of ANSI A118.3.

1. Non-toxic, non-flammalbe, non-hazardous during storage, mixing, application and when cured shall meet UL Greenguard Gold certification.

## 2.3 MASONRY ACCESSORIES

A. Comply with manufacturer's written instructions for mixing and mortar preparation for Type S Mortar.

B. Epoxy Mortar/Grout: Comply with manufacturer’s written instructions for mixing and preparation for Laticrete Spectralock Pro epoxy mortar/grout.

C. Fabricated Steel Lintels: Comply with METAL FABRICATIONS Section.

D. Flashing and Sheet Metal: Comply with FLASHING AND SHEET METAL Section.

E. Control Joints:

1. Rubber: ASTM D2000.

2. Vinyl: ASTM D2287.

F. Masonry Cleaning Materials: Standard-strength proprietary masonry cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new concrete masonry without discoloring or damaging masonry surfaces. Provide cleaning product expressly approved for intended use by cleaner manufacturer.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine substrates, structure, and installation conditions. Do not proceed with architectural concrete masonry Work until unsatisfactory conditions have been corrected.

B. Verify items provided by other Sections of Work are properly sized and located.

C. Verify that items to be built in are in proper location, and ready for roughing into masonry Work.

D. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

## 3.2 PREPARATION

A. Clean substrate surfaces thoroughly prior to installation.

B. Establish lines, levels and coursing. Verify anchors and flashings are correctly located and installed.

C. Furnish temporary bracing as required during installation of masonry Work. Maintain in place until building structure provides permanent support.

D. Do not wet concrete masonry units except as per TMS 402/602.

E. Prepare surfaces using the methods recommended by manufacturer for achieving the best result for the substrate under Project conditions.

3.3 INSTALLATION

A. Install in conformance with manufacturer's written instructions.

B. Layout walls in advance for accurate spacing of surface bond patterns, with uniform joint

1. Widths and to properly locate openings, movement type joints, returns and offsets. Whenever possible, avoid the use of less than half-size units at corners, jambs and other locations.

2. Notify Engineer when split masonry coursing at heads and sills of openings and cut concrete masonry coursing less than 4 inches in height not permitted.

C. Align glazed faces plumb, level and true to line; uniform joint widths carefully tooled; joints arranged neat and symmetrical, cut units sized and located for best appearance; free of imperfections detracting from overall appearance when viewed at 90 degrees from 5 feet.

D. Pattern bond: Lay exposed concrete unit masonry in running bond with vertical joint in each course centered on units in courses above and below. Bond and interlock each course of each wythe at corners. Do not use units with less than 4 inches of horizontal face dimensions at corners or jambs. Install special shape units where indicated.

E. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings, load bearing walls, all courses of piers, columns and pilasters and where adjacent to cells or cavities to be reinforced or filled with concrete or grout. Maintain 3/8-inch nominal joint widths, except as necessary at first course bed joints, and except for minor variations required to maintain bond alignment.

F. Lay solid concrete masonry units with filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints

G. Compress and cut joints flush for masonry walls that are below grade, concealed or covered by other materials.

H. Tool joints in all exposed masonry Work to a concave joint when thumb print hard, unless plans indicate otherwise. Use glass 5/8 inch jointing tool for concave joints; clean, non-staining metal tools elsewhere. Replace worn tools promptly.

I. Rake out joints at least 1/4 inch to allow for tuckpointing with epoxy grout, do not use smeared grout method to fill joints.

J. Tuckpointing: methods per ANSI A118.5 Chemical Resistant Industrial Grouting:

K. Follow manufacturer's written instructions for minimum cure time prior to grouting. Prior to use, store SPECTRALOCK Pro components for 24 hours at 70 degrees F. Substrate temperature shall be 45 to 90 degrees F. Verify joints are free of dirt and debris. Wipe dust/dirt off faces and remove water standing in joints. Pour SPECTRALOCK 2000 Pro Part A and Part B into a clean mixing pail and mix thoroughly with drill mixer until liquids are completely blended. Add SPECTRALOCK Part C powder. Mix thoroughly with a high-speed mixer (greater than 450 rpm) for a minimum of 2 minutes and until uniformly blended producing a grout to a toothpaste or peanut butter consistency. Grout may remain in bucket while grouting. Use grout bag with nozzle trimmed for placement into joint. Use a tooling tool or grout float to press and compact epoxy grout into joints. Keep glaze block surface clean. Inspect joints for pinholes/voids and repair them with freshly mixed grout. Do not use acid cleaners on epoxy grout less than 7 days old.

L. Keep Glaze Facing Clean: Wipe off mortar smears and spatters at once, using clean, soft, damp rags. Do not allow hardening.

M. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

N. Step back unfinished Work adjoining new Work. Rack back 1/2 unit length in each course; do not tooth. Clean exposed surfaces of set masonry and remove loose masonry units and mortar before laying fresh masonry.

O. Provide interlocking masonry bond in each course at corners and intersecting walls, unless otherwise indicated on plans such as for stack bond.

P. Load-bearing walls: If carried up separately, provide rigid steel anchors spaced not more than 2 feet on center vertically. Embed ends in mortar filled cores. Build full height of story to underside of structure. Grout juncture with structure solid with grout.

Q. Non-load-bearing walls: Build full height of story to underside of structure, except as otherwise shown. Terminate full height non-load-bearing walls one joint thickness below the structure to allow for deflection of the structural element without loading the wall. Provide an open joint for application of joint sealant.

R. As Work progresses, build in items specified under this and other Sections of Specifications. Fill in solidly with masonry around built-in items.

S. Bed hollow metal frame anchors in mortar. Align anchors with joint coursing. Draw anchors tight and fill space between hollow metal frames and masonry solid with fine mortar grout.

T. Provide solid masonry bearing for all lintels, beams, joists, plates, and load-bearing members.

1. Provide solid masonry units or hollow units filled solid.

2. Minimum one block course under steel angle lintels and steel joists not bearing on bond beams.

3. Minimum two block courses under steel beams and steel beam lintels. Where beams and lintels are parallel with wall, extend solid bearing to walls, extend solid bearing 16 inches each side of centerline of beam.

U. Install anchors and reglets for flashing and related Work built into masonry Work.

V. Install reinforcing steel and grout where indicated. Comply with Drawing details for reinforcing [steel size and spacing.

W. Control Joints: Provide control joints for exterior masonry construction.

X. Provide sash blocks with premolded shear key. Rake out mortar, if any, and form continuous vertical joints in masonry construction to receive joint sealant at the locations listed below.

Y. Locate control joints as indicated on Drawings.

Z. Bond Beams: Install bond beams where indicated. Comply with Drawings for reinforcing steel size and spacing. Fill bond beam masonry units solid with concrete fill or coarse mortar grout. Use smooth dowels to allow for horizontal movement at control joints unless otherwise indicated on Drawings.

AA. Lintels:

1. Install loose steel lintels furnished under METAL FABRICATIONS Section where shown. Set lintels in full bed of mortar.

2. Provide minimum bearing at each jamb of 4 inches for openings for less than 6 feet and 8 inches for wider openings

3. Flashing and weeps: Install flashing as specified in FLASHING AND SHEET METAL Section.

3.4 REINFORCED CONCRETE MASONRY

A. Grouting: Comply with TMS 402/602 grout placement requirements. Consolidate grout at time of placement.

1. Low-Lift Grouting: Place concrete fill/coarse masonry grout in maximum 5 foot vertical lifts.

2. High-Lift Grouting (If Approved): Place concrete fill/coarse masonry grout in maximum 12 foot vertical lifts (Recommend the use of super plasticizer with hi-lift grout).

B. Recess top of grout fill minimum 1-1/2 inches below top of course to form a key with following lift.

C. Where vertical reinforcing is required, install reinforcing before filling operation. Wet sticking of reinforcing is not permitted. Comply with Drawing details for reinforcing steel size and spacing.

D. Install bond beams where indicated. Install reinforcing before filling operation. Fill units solid with grout. Comply with Drawing details for reinforcing steel size and spacing.

## 3.5 REPAIR AND POINTING

A. Clean and point exposed architectural concrete masonry at end of each working day. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged. Provide new units to match adjoining units and install in fresh mortar pointed to eliminate evidence of replacement.

B. During the tooling of joints, enlarge any voids or holes, except weeps and completely fill with mortar. Point up joints at corners, openings and adjacent Work to provide a neat, uniform appearance. Remove line pins and fill all line pin holes.

C. Wipe off excess mortar as Work progresses. Use dry brush with bristle brushes on non-glazed exposed masonry at the end of each day's Work. Remove mortar spatters and joint ridges.

## 3.6 FIELD QUALITY CONTROL

A. Testing and Inspecting: Department shall engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and Work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's sole cost and expense.

B. Inspections: Level 1 special inspections in conformance with International Building Code.

C. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.

D. Place grout only after, inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.

E. Place grout only after inspectors have verified proportions of site-prepared grout.

F. Testing Prior to Construction: One set of tests.

G. Testing Frequency: One set of tests for each 5,000 square feet of wall area or portion thereof.

H. Concrete Masonry Unit Test: For each batch provided, conforming to ASTM C140/C140M for compressive strength.

I. Mortar Test (Property Specification): For each mix provided, conforming to ASTM C780. Test mortar for mortar air content and compressive strength. ASTM C780 is a field test and shall not be used to show conformance to ASTM C270.

J. Grout Test (Compressive Strength): For each mix provided, conforming to ASTM C1019.

K. Prism Test (if required): For each type of construction provided, conforming to ASTM C1314 at 7 days and at 28 days.

3.7 CLEANING

A. Cut out defective mortar joints and holes in exposed masonry and re-point with mortar of matching color and texture. Commence cleaning of the masonry walls as soon as the mortar is thoroughly set and cured. After mortar has cured for a period of 7 days (and no later than 14 days after completion of installation), the cleaning process can begin.

B. Glaze units shall be cleaned with industrial strength detergents such as Vana-trol® in strict conformance with cleaner manufacturer's written instructions including thorough rinsing. Damp-dry with clean, soft rags. Do not use steel wool, other abrasives or any product containing unbuffered hydrochloric acid or other acids.

C. Demonstrate the cleaning procedure on the sample panel at Project Site prior to commencing cleaning on the building. When the sample panel is cleaned to the approval of Engineer, and the walls are complete, clean the building with the approved cleaning method.

D. Protect adjacent and surrounding surfaces not intended to be cleaned from exposure to the cleaning chemical to prevent damage.

E. Prevent cleaning chemical from coming into contact with people, motor vehicles, landscaping and other building materials that could be harmed by such contact. Follow masonry cleaner manufacturer's written instructions for personal protection.

F. Clean architectural concrete masonry in conformance with cleaning product manufacturer's written instructions. This includes taking care not to deface masonry surfaces after cleaner application. Do not use high pressure cleaning or aggressive scrubbing after cleaner application (water pressure should be no greater than 50 psi.

G. The results of the cleaning process shall be inspected by Engineer or authorized owner representative for acceptance after the walls have dried. For cleaning results to be accepted, walls shall comply with the standard set for the cleaning results on the sample panel, and the walls shall be free from mortar or efflorescence stains, and the color and texture of the finished walls shall not show damage, discoloration or staining from the cleaning process. If such damage or stains are present, then the walls shall be cleaned and color corrected, as needed, to remove any such stains, discoloration or damage prior to the application of coatings

H. Non-Glazed Units: After cleaning allow units to dry and when specified apply a sealer as provided in Coating Article of this Section.

3.8 COATING

A. After the results of the cleaning process have been fully accepted by Engineer, apply a colorless, non-staining, non-yellowing, breathable, penetrating water repellent. It shall be applied to the exterior exposed surface of the concrete masonry walls. Water-repellents shall be capable of performing over hairline cracks and small voids less than 1/16 inch. Film Forming Acrylic sealers shall not be allowed. The water-repellent shall not alter the color or texture of the wall after the material has fully cured. Follow manufacturer’s application recommendations.

3.9 PROTECTION

A. Protect installed products until completion of Project.

B. Protect top of wall until covered or capped to a waterproof condition by subsequent construction.

C. Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that comes in contact with such masonry.

D. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.

E. Protect sills, ledges, and projection from mortar splatter and dropping.

F. Protect surfaces of windows and door frames; as well as similar products with painted and integral finishes from mortar splatter and dropping.

G. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Hot-dip galvanizing of ferrous metal fabrications and structural steel.

B. For Work shown on Drawing No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

1.2 RELATED SECTIONS

A. Section 05 05 14 - Treating Damaged Galvanizing

B. Section 05 12 02 - Structural Steel

C. Section 05 50 00 - Metal Fabrications

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires shop-applied coatings for metals.

1.4 REFERENCES

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

B. ASTM A143/A143M - Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

D. ASTM A384/A384M - Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.

E. ASTM A385/A385M - Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip).

F. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric).

G. ASTM B6 - Standard Specification for Zinc.

1.5 SUBMITTALS

A. The following shall be submitted to Engineer:

1. Certification:

a. Each certificate shall be co-signed by Contractor and galvanizer certifying that steel materials, bolts, nuts, washers, and items of iron and steel hardware conform to the specified requirements.

b. Manufacturer's product data.

2. Test Reports.

3. Safety Data Sheets (SDS): Safety Data Sheets for each type of material used in Work.

1.6 QUALITY ASSURANCE

A. Galvanizing Firm: Member of American Galvanizers Association Inc. (AGA).

B. Engage the services of a qualified galvanizer who has demonstrated a minimum of ten years' experience in the successful application of hot-dip galvanized coatings.

C. Inspection and Tests:

1. Inspections, tests, and samples: Conform to American Society of Testing and Materials (ASTM International) Specifications and Standards.

2. Rights and privileges, procedures, and acceptance or rejection of galvanized steel materials shall be in conformance with ASTM A123/A123M.

3. Inspection and tests include the following:

a. Visual examination of samples and finished products.

b. Tests to determine weight or mass of zinc coating per square foot of steel surface.

c. Tests to determine distribution and uniformity of zinc coating.

d. Tests to determine thread fittings of units, washers, and bolts.

1.7 DEFINITIONS

A. Hot-Dip Galvanizing: Dipping steel members and assemblies into molten zinc for lasting, or long-term corrosion protection. Resultant zinc coating fuses permanently with base steel material.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Packaging - Prevent damage to galvanized surfaces and distortion of steel materials and components.

B. Handling and Storage:

1. Conform to ASTM A123/A123M.

2. Protect galvanized materials from damage to zinc coating.

3. To avoid humid storage stain, space surfaces of galvanized materials to permit free circulation of air.

C. Damaged Materials:

1. Repair material showing evidence of damage to zinc coating. Limit repair to minor, incidental assembly damage, as required for field welding, and as acceptable to Engineer.

2. If not repairable, material with damaged coating shall be rejected.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Materials:

1. Geometrically suitable for galvanizing as specified in ASTM A384/A384M and ASTM A385/A385M.

2. Steel materials suitable for galvanizing include structural shapes, pipe, sheet, fabrications, and assemblies.

3. Material shall be chemically suitable for galvanizing. Verify with supplier or fabricator.

B. Iron and Steel Hardware:

1. Bolts, nuts, washers, and items of iron and steel hardware furnished for galvanizing shall be suitable for hot-dip galvanizing.

a. Threaded components (bolts and nuts) of a fastener assembly must be galvanized by the same process. Mixing bolts that are galvanized by one process with nuts that are galvanized by a second process may result in an unworkable assembly.

2. Inspection:

a. Inspect iron and steel hardware before galvanizing and verify suitability for galvanizing.

b. Replace items which are not suitable for galvanizing.

C. Zinc for Galvanizing:

1. Conform to ASTM B6, as specified in ASTM A123/A123M.

PART 3 - EXECUTION

3.1 GALVANIZING

A. Steel members, fabrications, and assemblies to be galvanized after fabrication:

1. Method: Hot-dip process in conformance with ASTM A123/A123M, except if modified by other sections with regard to weight of galvanized coating.

2. Weight of zinc coating: Conform to requirements of ASTM A153/A153M unless specified in other sections. If items are not specified in ASTM A153/A153M coat at 2.0 oz. per square foot.

3. Components: Smooth after galvanizing.

B. Safeguard against steel embrittlement in conformance with ASTM A143/A143M.

C. Safeguard against warping or distortion of steel members in conformance with ASTM A384/A384M. Notify Engineer of potential warping problems which require modification in design before proceeding with steel fabrications.

D. Finish and uniformity of zinc coating and adherence of coating shall be in conformance with ASTM A153/A153M.

E. Bolts, nuts, and washers, and iron and steel hardware components: Galvanize in conformance with ASTM A153/A153M.

1. Weight of zinc coating: In conformance with ASTM A153/A153M.

2. Tap nuts after galvanizing to minimum diameter amounts in conformance with ASTM A563/A563M.

3. Coat nuts with waterproof lubricant: Clean and dry to touch.

3.2 TOUCH-UP AND REPAIR

A. Conform to TREATING DAMAGED GALVANIZING Section.

3.3 INSPECTION AND TESTING

A. Inspection and testing of hot-dip galvanized coatings to be under the guidelines provided in AGA publication Inspection of product hot-dip galvanized after fabrication.

B. Visual examination and tests shall be performed as required in conformance with applicable standards to determine the thickness of zinc coating on the metal surface.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Repair materials for damaged galvanizing.

B. For Work shown on Drawing No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

1.2 RELATED SECTIONS

A. Section 05 12 02 - Structural Steel

B. Section 05 50 00 - Metal Fabrications

C. Section 09 90 01 - Painting for Exterior Improvements

D. Section 26 05 34 - Outlet, Junction, and Pull Boxes

E. Section 26 05 41 - Rigid Galvanized Steel Conduit

F. Section 32 31 13 - Chain Link Fences and Gates

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires treatment of damaged galvanizing.

1.4 REFERENCES

A. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials shall be zinc-based alloys, zinc-rich paints, or sprayed zinc in conformance with ASTM A780/A780M.

B. The following product is acceptable: Carbozinc 859 VOC manufactured by Carboline Company, (314) 644-1000 or (800) 848-4645.

C. Products shall be in compliance with South Coast Air Quality Management District (SCAQMD) regulations.

D. Materials shall comply with City of Los Angeles Green Building Code requirements.

1. Enter product data in VOC Content Verification Checklist form and provide product specification sheets. Make checklist and specifications available to City of Los Angeles Department of Building and Safety inspector through Engineer upon request. VOC Content Verification Checklist can be found here: https://ladbs.org/docs/default-source/forms/green-building-2023/grn_2_voc_content_verification_checklist-01.17.23.pdf?sfvrsn=19f4c153_10

PART 3 - EXECUTION

3.1 REPAIR

A. Repairs shall be in conformance with ASTM A780/A780M and manufacturer's latest material safety data sheet instructions.

B. Coating thickness shall be a minimum of 3.0 mils in dry film thickness.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Requirements and procedures for welding of structural items including but not limited to the following:

1. Structural steel pipe piles

2. Other structural steel

B. For Work shown on Drawing No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

## 1.2 RELATED SECTIONS

A. Section 05 12 02 - Structural Steel

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires structural welding.

## 1.4 REFERENCES

A. API RP 2A-WSD - Planning, Designing, and Constructing Fixed Offshore Platforms—Working Stress Design.

B. API Spec 2B - Specification for the Fabrication of Structural Steel Pipe.

C. API Spec 5L - Line Pipe.

D. ASTM A370 - Standard Test Methods and Definitions for Mechanical Testing of Steel Products.

E. ASTM E23 - Standard Test Methods for Notched Bar Impact Testing of Metallic Materials.

F. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments.

G. ASTM E165/E165M - Standard Practice for Liquid Penetrant Testing for General Industry.

H. ASTM E709 - Standard Guide for Magnetic Particle Testing.

I. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

J. AWS D1.1/D1.1M - Structural Welding Code - Steel.

K. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars.

1.5 SUBMITTALS

A. Submit welding procedures for review by Engineer prior to the start of production welding for each particular joint to be used. Use only approved procedures. For weld procedure qualification, refer to Quality Assurance Article of this Section. The following information shall be included:

1. Scope of Work performed under each procedure.
2. Base metals, applicable specifications, and relevant characteristics.
3. Welding process and equipment.
4. Types, size, classification, and composition of welding electrodes of filler metals (specify wire-flux combinations for submerged arc welding).
5. Type of current, current characteristics (pulse types, and the like) and current range.
6. Heat input and welding speed when applicable.
7. Joint preparation and cleaning procedures.
8. Tack welding procedure.
9. Applicable welding positions.
10. Preheat and interpass temperatures.
11. Weld types and sizes.
12. Root preparation prior to welding from second side.
13. Welding sequences employed to control warpage, distortion and excessive accumulations of residual joint stresses.
14. Removal methods for weld defects.
15. Repair welding procedure.

16. Postweld heat treatments.

1.6 QUALITY ASSURANCE

A. Welders, welding operators, and tackers shall be qualified by test as prescribed in American Welding Society (AWS) AWS D1.1/D1.1M and shall be City of Los Angeles Building and Safety certified. Record of the test results and certificates of qualification of personnel shall be made available to Engineer upon request.

B. Each qualified welder and welding operator shall be supplied with an identifying color crayon or chalk and number with which the welder can mark the steel to identify welds at intervals not more than 3 feet apart. Areas not clearly marked may be rejected by Engineer.

C. Weld procedures shall be qualified in conformance with Section 5.2 of AWS D1.1/D1.1M. Before commencing production welding, submit a procedure qualification record to Engineer for review. This document shall list the variables (essential and non-essential) employed to make the procedure qualification test weld and shall include the results of physical and mechanical testing. This shall be a factual document and shall not contain general statements and shall give the actual value of the variable used, not a specified range. Appropriate forms in Appendix E of AWS D1.1/D1.1M may be used.

D. Testing required in the procedure qualification tests shall be carried out by an independent testing laboratory approved by Engineer, at Contractor's sole cost and expense.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Items of equipment for welding, electrodes, welding wire, and fluxes shall be capable of producing satisfactory welds when used using qualified welding procedures. Welding materials shall comply with the applicable requirements of AWS D1.1/D1.1M or AWS D1.4/D1.4M and applicable requirements of AWS filler material specifications.

B. Electrodes:

1. Electrodes used shall be low hydrogen electrodes. E70XX for both fillet welds and full penetration groove welds, except electrodes of welding of reinforcing bars shall conform to the requirements of AWS D1.4/D1.4M.

2. When base metals of 2 different yield stresses are welded together, select filler metal based on the base metal which has the higher yield stress.

3. Notch toughness requirements: The as-deposited weld metal shall have a minimum impact strength of 20 foot-pounds of 0 degrees Fahrenheit (F) for welds joining structural steel with a yield joint above 40 kips per square inch. For testing, refer to Field Quality Control Article of this Section.

2.2 TYPES OF WELDING

A. Any type of structural welding specified in Section 4.1 of AWS D1.1/D1.1M may be used except electroslag or electrogas welding. Fabrication of built-up beam and girders shall be submerged arc welding where possible. For welding of shear studs, Section 4, Part "F" of AWS D1.1/D1.1M, shall apply.

PART 3 - EXECUTION

3.1 WELDING PROCEDURES

A. Welding shall be in conformance with AWS D1.1/D1.1M, AWS D1.4/D1.4M, and with this Section.

B. Prior to commencing production welding, establish detailed welding procedures for welding the various parts of the structure in accordance with connection details of Drawings and in conformance with the applicable requirements of AWS D1.1/D1.1M and AWS D1.4/D1.4M.

C. The welding procedure may include preheating, interpass heating, post heating, block welding, back step methods, simultaneous deposition, and other planned methods of control. Provide for the necessary supervision to ensure strict adherence to the procedure. Appropriate forms in Appendix E of AWS D1.1/D1.1M may be used.

3.2 DETAILS OF WELDED JOINTS

A. Full Penetration Groove Welds:

1. Full penetration groove welds shall be detailed in conformance with AWS prequalified welded joints. Select a suitable joint detail based on the thickness of the jointing base metals such that it shall not cause lamellar tearing due to the shrinkage of the welds.

2. Structural Fillet Welds:

    a. Size of structural fillet weld shall be as shown on Drawing but not less than the minimum size as required by AWS D1.1/D1.1M.

3. Partial Penetration Groove Welds:

    a. Partial penetration groove welds are not allowed unless called out on Drawings.

4. Tubular Member Joints:

    a. Tubular members shall have full penetration groove welds as detailed on Drawings or in conformance with AWS prequalified tubular joints.

5. Tack Welding:

    a. Tack welds shall be carried out by qualified operators. Tack welds shall be subject to the same preheat requirements as structural welds.

6. Arc Strikes:

    a. There shall be no arc strikes on the base material outside the weld groove or weld area.

7. Temporary Attachments:

    a. Temporary and assembly attachments shall be kept to a minimum and shall be welded in conformance with Specifications.

    b. Welded temporary attachments shall be removed by flame cutting or gouging a minimum of 1/4 inch above the surface of the base material and finished smooth and flush by grinding.

## 3.3 PREHEAT AND INTERPASS TEMPERATURE REQUIREMENTS

A. Preheat and interpass temperatures shall be sufficient to prevent crack formation. The minimum preheat and interpass temperatures shall be in conformance with Table 4.2 of AWS D1.1/D1.1M.

B. In joints involving combination of base metals, preheat shall be as specified for the higher strength steel being welded.

C. Preheating shall be performed in such a manner that the surfaces of the parts on which metal is being deposited are at or above the specific minimum temperature for a distance equal to the thickness of the part being welded, but not less than 3 inches, both laterally and in advance of the welding.

3.4 POSTWELD AND STRESS RELIEF HEAT TREATMENT

A. The necessity of postweld heat treatment depends on Contractor proposal as included in the welding procedures.

B. If postweld heat treatment is required, weld assemblies shall be stress relieved by heat treating in conformance with AWS D1.1/D1.1M, Section 3.9.

3.5 ASSEMBLY

A. The parts to be joined by fillet welds shall be brought into as close contact as practicable. The separation between parts shall not exceed 3/16 inch. If the separation is 1/16 inch or greater, the leg of the fillet weld shall be increased by the amount of the separation.

B. No welding shall be done until as much of the structure as shall be stiffened has been properly aligned.

C. Run-off tabs shall be used to complete the butt weld at the edge of 2 adjoining plates.

D. Tack welds shall be subject to the same quality requirements as the final welds.

E. Tack welds not incorporated into final welds shall be removed before applying the final structural welds.

3.6 CONTROL OF DISTORTION AND SHRINKAGE

A. Deposit welds in a sequence that shall minimize distortion and shrinkage.

B. Submit a welding sequence and distortion control program to Engineer for information and review before the start of welding on a member or structure in which shrinkage or distortion is likely to affect the adequacy of the member or structure.

3.7 WEATHER PROTECTION

A. Contractor shall establish sufficient shielding to protect each welding site from rain, sand, and wind.

3.8 IDENTIFICATION OF ELECTRODES, WIRE, AND FLUX

A. Manual type electrodes shall be properly identified up to the time of usage. Each electrode shall be distinguishable by color code marking. Each batch of flux shall be labelled with the information from the supply container.

3.9 PAINT REMOVAL

A. Any paint on surface adjacent to joints to be welded shall be thoroughly removed to expose clean steel within 2 inches of the joint.

3.10 PILE DRIVING

A. Pile driving shall not be allowed until the pile weld area is no more than warm to touch if the pile is spliced in field.

3.11 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. General:

a. Work is subject to inspection by Engineer to ensure that materials and quality of Work conform to Drawings and Specifications. This inspection does not relieve Contractor of the responsibility for errors or omissions.

b. Welding inspection and testing shall conform to Section 6 of AWS D1.1/D1.1M and to the applicable portions of API RP 2A-WSD.

c. Pipe and heavy-wall tubular members manufactured and tested in conformance with API Spec 2B and API Spec 5L shall be considered acceptable without further testing in the assembly site. Welds connecting such members shall be inspected as specified in the following paragraphs of this Article.

2. Procedure, standards, and acceptance criteria are listed in Table 1, included in this Section.

3. Percentage of tests in welds are shown in Table 2, included in this Section, except for the percentage of tests in offshore welds, which are shown in Table 3, included in this Section. Offshore welds are defined as welds where the welding is performed above water.

4. Percentage of length of weld tested in a given type of connection shall be as shown in Table 2 and Table 3, but not less than 1 spot of 4 inches weld length for radiographic and ultrasonic testing. Testing shall be in random spot and in conformance with AWS D1.1/D1.1M. Location of the spot testing shall be determined by Engineer.

5. If ultrasonic or magnetic particle inspection of weld appears to indicate any defect, then such weld shall be thoroughly re-examined by any means including radiographic as described by Engineer.

6. Welds shall also be examined for inadequate penetration, incomplete fusion, burned-through areas, slag inclusions, gas pockets, under cutting, and improper weld geometry. If these or any other defects are discovered which in the opinion of Engineer are detrimental to the integrity of the structure, then such welds shall be repaired or replaced by Contractor at no cost to Department.

7. Contractor shall be solely responsible for the cost of testing, repairing or replacing, and retesting welds found to be defective.

8. Depending on the results of non-destructive examination called for above, the percentage of welding inspection may be adjusted accordingly by Engineer.

9. To pass the visual examination and magnetic particle test or liquid penetrant test, welds shall present a uniform appearance and excessive undercut shall be held at a minimum.

10. Charpy V-notch impact test requirements of the as deposited weld metal 40 kips per square inch shall be tested. Charpy V-notch test specimen shall be tested conforming to ASTM A370 and ASTM E23.

## 3.12 CORRECTIONS AND REPAIRS

A. When inspection or test indicates defects in the weld joints, the weld shall be repaired at the cost of Contractor. Corrections and repairs shall be in conformance with AWS D1.1/D1.1M.

B. Submit repair procedure for approval of Engineer prior to such operation.

C. Test the repaired weld for soundness. The method of testing, depending on the type of weld shall be as specified in this Section.

D. Engineer has the right to reject any weld under the following conditions:

1. That welds do not conform to AWS D1.1/D1.1M and this Section.
2. That welds do not conform to Drawings.
3. That welds cause excessive distortion and shrinkage of the adjoining members.
4. That any weld impairs the safety of the member or structure.

| TABLE 1 | | |
|---|---|---|
| | | |
| TESTING | PROCEDURE AND STANDARDS | ACCEPTANCE CRITERIA |
| Visual Inspection | To comply with the drawings and the requirements of AWS D1.1/D1.1M | AWS D1.1/D1.1M Section 8.15.1 for Non-Tubular Members AWS D1.1/D1.1M Section 10.17.1 for Tubular Member |
| Radiographic Test | AWS D1.1/D1.1M Section 6 Part B | AWS D1.1/D1.1M Section 8.15.3 for Non-Tubular Members AWS D1.1/D1.1M Section 10.17.3 for Tubular Member |
| Ultrasonic Test | 1. Test method in conformance with ASTM E164<br>2. Procedure and standards in conformance with AWS D1.1/D1.1M Section 6 Part C | AWS D1.1/D1.1M Section 8.15.4 for Non-Tubular Members AWS D1.1/D1.1M Section 10.17.4, Class R for Tubular Members |
| Magnetic Particle Test (1) | Test method in conformance with ASTM E709 | AWS D1.1/D1.1M Section 8.15.5 for Non-Tubular Members AWS D1.1/D1.1M Section 10.17.5 for Tubular Members |
| Liquid Penetrant Test (1) | Test method in conformance with ASTM E165/E165M | AWS D1.1/D1.1M Section 8.15.5 for Non-Tubular Members AWS D1.1/D1.1M Section 10.17.5 for Tubular Members |
| (1) Either type of testing may be used. | | |

TABLE 2

PERCENTAGE OF TEST IN WELDS

| ITEMS | MEMBERS | TYPES OF WELD | VISUAL INSPECTION | RADIOGRAPHIC TEST | ULTRASONIC TEST | MAGNETIC PARTICLE OR LIQUID PENETRANT |
|---|---|---|---|---|---|---|
| 1. | Pipe Piles | Circumferential butt joints - groove welds (Girth weld) | W-100%<br>L-100% | W-100%<br>L-100% | -- | -- |
| 2. | Padeye to Shape or to Tubular Member Connection. | T. Skewed T or Corner Joints of structural plates-Fillet or Groove welds | W-100%<br>L-100% | -- | W-100%<br>L-100%<br>where applicable | W-100% (1)<br>L-100%(1) |
| 3. | Flange Splice | Butt Joint-Groove Welds | W-100%<br>L-100% | W-100%<br>L-25% | | |
| 4. | Web Splice | | | | | |
| 5. | All Connections & Splices | To check cracks in fillet welds | W-100%<br>L-100% | --<br>-- | --<br>-- | W-100%<br>L-25% |
| 6. | Location to be Determined by the Engineer | Butt Weld | W-100%<br>L-100% | W-25%<br>L-25% | -- | -- |

LEGENDS W - Percentage of number of weld (Subsection 3.1(b) 3).
L - Percentage of length of weld.

(1) Use when Ultrasonic Test is not applicable

TABLE 3

PERCENTAGE OF TESTING IN OFFSHORE WELDS

| ITEMS | MEMBERS | TYPES OF WELD | VISUAL INSPECTION | RADIOGRAPHIC TEST | ULTRASONIC TEST | MAGNETIC PARTICLE OR LIQUID PENETRANT |
|---|---|---|---|---|---|---|
| 1.<br>2. | Pipe Pile<br>Pilehead to Pile Connection | Circumferential Butt Joint (Girth Weld) - Groove Weld | W-100%<br>L-100% | W-100% (1) L-100% (1) | W-100% (1)<br>L-100% (1) | --- |
| 3. | All Connections & Splices | To check cracks in fillet weld | W-100%<br>L-100% | --- | --- | W-100%<br>L-25% |

LEGENDS W - Percentage of number of weld (Subsection 3.1(b) 3).
L - Percentage of length of weld

(1) Use either Radiographic Test or Ultrasonic Test

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Structural steel Work

B. For Work shown on Drawing No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

1.2 RELATED SECTIONS

A. Section 05 05 14 - Treating Damaged Galvanizing

B. Section 05 05 24 - Structural Welding

C. Section 05 12 24 - Structural Steel Tests and Inspections

D. Section 09 90 01 - Painting for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires structural steel.

1.4 REFERENCES

A. 8 CCR 1710 - Structural Steel Erection.

B. ASME B18.21.1 - Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers (Inch Series).

C. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

G. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

H. ASTM A435/A435M - Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates.

I. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

J. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

K. ASTM D962 - Standard Specification for Aluminum Powder and Paste Pigments for Paints.

L. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.

M. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification.

N. AWS D1.1/D1.1M - Structural Welding Code - Steel.

O. FS TT-V-81 - Varnish: Mixing, for Aluminum Paint.

P. SSPC-SP 3 - Power Tool Cleaning.

1.5 QUALITY ASSURANCE

A. Welders' Qualifications:

1. Before assigning welders to Work, provide Engineer with certification that each welder employed on Work has passed qualification tests using procedures covered in AWS B2.1/B2.1M, Part 11 and is certified by City of Los Angeles Department of Building and Safety.

2. Contractor shall require welder to retake the test when Work of the welder creates a reasonable doubt as to proficiency.

3. Tests, when required, shall be conducted at no additional expense to Department. Recertification of the welder shall be made to Engineer only after the welder has taken and passed the required retest.

4. Coupons cut from location in joint may be required for testing.

    a. Sections of welds found defective shall be chipped or cut out to base metal and re-welded before proceeding with Work.

    b. Should 2 coupons cut from Work of welder show strengths, under test, less than that of the base metal, it shall be considered evidence of negligence or incompetence and such welder shall be permanently removed from Project Site.

    c. When coupons are removed from part of a structure, the members cut shall be repaired, at no additional cost to Department, in a manner with joints of type to develop the full strength of the member and joints cut, with peening as necessary or directed to relieve residual stress.

B. Erection and bracing plan and procedure shall be in conformance with 8 CCR 1710 and City of Los Angeles Building Code. Employ and pay a State of California registered structural engineer to prepare an erection and bracing plan and erection procedure for structural steel, including columns, beams, and girders. Contractor's structural engineer shall be solely responsible for Code compliance. Keep a copy at Project Site as required by California Division of Industrial Safety. Submit 2 copies of stamped erection and bracing plan and procedure for record purposes only, not for review or approval.

C. Certifications:

1. Mill materials shall have heat and melt numbers with mill analyses and certified test reports.

2. Provide test specimens required by testing laboratory.

D. Conform to the requirements of American Institute of Steel Construction (AISC) Manual of Steel Construction as applicable.

E. Materials shall comply with the current rules and regulations of the local air quality management district, with the rules regarding volatile organic compounds, and with Food and Drug Administration (FDA) rules and regulations for dangerous materials.

F. Testing and inspections of structural steel are specified in STRUCTURAL STEEL TESTS AND INSPECTIONS Section.

## 1.6 SUBMITTALS

A. A complete set of approved shop and erection drawings.

B. Cutting lists, order sheet material bills, shipping bills, and mill test reports.

C. Information as to the shipment of material to the shop.

D. Representative sample pieces as requested by the testing agency.

E. Full and ample means and assistance for testing material.

F. Facilities, including scaffolding, temporary Work platforms for inspection of Work in the shop and field.

G. Mill Test Reports:

1. Submit certified copies of mill test reports for steel and high strength bolts furnished. Include the following:

    a. Names and locations of mills and shops.

    b. Analysis of chemical and physical properties of steel.

    c. City of Los Angeles Research Report (LARR) number.

2. In addition to the normal information, mill orders shall include American Society for Testing and Materials (ASTM International) specifications description, marking, and invoicing requirements. The mill shall be instructed to include the following markings. Markings may be of any of the means permitted by ASTM A6/A6M:

    a. Mill order number.

    b. Heat number.

    c. Size.

    d. Type and grade of material.

    e. Color coded as specified.

H. Shop Drawings:

1. Submit detailed drawings showing grade of steel, identification marks or members, dimensions, size, weight, orientation, and location of each member, setting elevation of base plates and bearing plates, location, types, sizes and extent of welds, welding sequences; identify and show connections.

2. Submit erection drawings and index sheets at same time as shop details. The use of Contract Drawings as erection drawings shall not be allowed.

3. Show and identify temporary members and connections which may be required for erection.

4. Submit structural calculations for connections prepared by a State of California-registered professional engineer, for those connections not designed and detailed on Drawings.

5. Submit proposed erection procedure including loads and details of erection equipment and temporary bracing.

6. The details shall be prepared in such a way as to avoid having steel, connections, and bracing interfere with architectural features.

7. Submit manufacturer's literature and certification that shop paint meets South Coast Air Quality Management District (SCAQMD) VOC requirements.

I. Detail minor connections and fastenings not shown or specified to meet required conditions. Include detailed sequence plan for shop and field welding that minimizes locked-in stresses and distortions.

J. Erection Survey: Provide set of reproducible transparencies of Erection Survey.

K. Fabricator's test results.

L. Manufacturer's certification of filler metal for welding.

1.7 DELIVERY, STORAGE, AND HANDLING

A. General: Protect materials from damage during shipping, handling and storage on Project Site. Steel showing dents, creases, deformations, weathering, or other defects is not acceptable.

B. Deliver welding electrodes to Project Site in unbroken packages bearing the manufacturer's name and label identifying the contents.

1.8 FIELD CONDITIONS

A. Take field measurements as required. Report to Engineer discrepancy between Drawings and field dimensions.

B. Protect floor slab and adjacent Work from damage. Do not overload floors. Use rubber tired equipment to handle and move steel. Do not place steel members directly on floor; use pads of timber or like material for cushioning.

C. Provide temporary scaffolding and flooring for erection of structural steel or support of erection machinery. Conform use of temporary floors or steel decking to City of Los Angeles Building Code.

D. Temporarily weld steel decking to supports where used as a working platform. Distribute concentrated loadings from welding machines to other heavy machinery with planking or equal. Replace decking damaged by use as a working platform at no additional cost to Department.

PART 2 - PRODUCTS

2.1 STRUCTURAL STEEL MATERIALS

A. Refer to Structural Drawings for designation of types of steel. Steel shall conform to ASTM A36/A36M, unless shown otherwise on Drawings. Plates shall be furnished to qualify for ultrasonic examination in conformance with ASTM A435/A435M.

B. Steel pipe shall be in conformance with ASTM A53/A53M, Grade B where used for structural purpose.

C. Structural Tubing:

1. Hot-formed shall be in conformance with ASTM A501/A501M.

2. Cold-formed shall be in conformance with ASTM A500/A500M, Grade B, Fy = 46 ksi.

D. Bolts and nuts shall be American National coarse-thread series.

1. Unfinished bolts and nuts, anchors and fastening in conformance with ASTM A307.

2. High-strength bolts and nuts shall conform to Specifications for Structural Joints, using ASTM F3125/F3125M Bolts.

3. Shear Stud Connectors:

    a. Conform to AWS D1.1/D1.1M. Shear connectors shall develop a minimum design value of 9.5 kips per connector with a minimum safety factor of 2.5.

    b. Substitution of shear connectors with design shear capacity other than given above shall be acceptable, provided total horizontal shear capacity in a span of a beam or girder is unaltered.

    c. The arrangement and spacing of shear connector shall be subject to Engineer's review.

4. Washers:

    a. Plain washers, other than those in contact with high-strength bolt heads and nuts shall conform to ASME B18.21.1.

    b. Beveled washers shall be square, smooth, and sloped so that contact surface of bolt head and nut are parallel.

    c. The diameter of hole of square-beveled washer shall be 1/16 inch greater than the bolt size for bolts larger than 1 inch.

    d. Washers in contact with high-strength bolt heads and nuts shall be hardened washers in conformance with Specifications for Structural Joints using ASTM F3125/F3125M bolts.

    e. Washers shall be installed on nut side of bolt for torqueing as required.

E. Filler metal arc-welding electrodes shall conform to requirements of AWS D1.1/D1.1M. Electrodes shall be as recommended by their manufacturers to suit the position of other conditions of actual use.

1. Shielded metal arc-welding use E70 XX series.

2. Submerged arc-welding use F7 series.

## 2.2 MISCELLANEOUS ITEMS

A. Provide miscellaneous structural steel items and their related components required to complete Work. Provide in conformance with Drawings and Specifications. Such items include, but are not limited to, built-in items, leveling plates, anchors, bearing plates, base, reinforcing angles, straps, brackets, and hangers.

B. Primer:

1. Surfaces to be painted shall be primed as required in PAINTING FOR EXTERIOR IMPROVEMENTS Section.

2. Surfaces to receive sprayed-fireproofing shall be primed compatible with fireproofing; approved and tested by fireproofing manufacturer.

3. Other surfaces shall be primed as required in PAINTING FOR EXTERIOR IMPROVEMENTS Section.

## 2.3 GENERAL FABRICATION REQUIREMENTS

A. According to the approved submittals, reference standards as applicable. Fabricate and form Work to meet actual installation conditions verified at Project Site.

B. Fabricate and assemble structural material in the shop to the greatest extent possible.

C. Wire brush material, clean off loose mill scale and rust, and straighten by methods that shall not injure the steel prior to fabrication. Remove twists or bends after punching or working component parts of a member before the parts are assembled. Produce finished members free from twists, bends, or open joints when erected.

D. Shearing, flame cutting, and chipping shall be done accurately. Sole plates of beams and girders shall have full contact with the flanges. Stiffeners shall be fitted between the flanges or girders, and, where tight fits are required to transmit bearing, the ends of stiffeners shall be milled or ground to secure an even bearing against the flanges. Splice plates and fillers under stiffeners shall fit within 1/8 inch of the flanges.

E. Assembled pieces shall be taken apart, if necessary, for the removal of burrs and shavings produced by the reaming operation.

F. Parts not completely bolted in the shop shall be secured by temporary bolts, insofar as practicable, to prevent damage in shipment and handling.

G. Drilling, Punching, and Reaming of Holes: Hole burning to make or enlarge previous holes is allowed only with prior approval of Engineer. Prepare required holes in structural steel members for attachment or passage of Work of other trades. Where allowed, steel may be punched 1/16 inch larger than the nominal diameter of the bolt when the steel thickness is equal to or less than diameter of the bolt plus 1/8 inch. Where the steel is thicker than the diameter of the bolt plus 1/8 inch, the holes shall be drilled or sub-punched and reamed. Diameter of sub-punched holes, and the drill for sub-drilled holes, shall be 1/16 inch smaller than the nominal diameter of bolt to be installed. Precisely locate finished holes to ensure passage of bolts through steel assemblies without drifting. Enlarge holes only by reaming. Poor matching of holes is cause for rejection.

H. Punch and drill or ream holes for anchor bolts in base and bearing plates. Do not make or enlarge the holes by burning except for grouting holes in column bases.

I. Use of gas cutting torch is allowed where the metal being cut is not stressed during the operation, and provided stresses are not transmitted through a flame-cut surface. Make gas cuts with smooth regular contour. Deduct 1/8 inch from width of gas cut edges to determine effective width of member that is gas cut. Make radius of reentrant gas cuts as large as possible, but 1 inch minimum.

J. Press or mill steel column base plates 4 inches thick or less for straight contact bearing between plate and column.

K. Mill column and compression truss members and bearing stiffeners to give full bearing over the cross section. Plane contact surfaces of grillages and bearing plates. It is not necessary to plane bottom surfaces of plates or grillages on grout beds.

2.4 CONNECTIONS

A. Whether shown on Drawings or not, the fabricator shall design required connections to safely resist shear, axial load, and moment given on Drawings.

B. Where moment connections are indicated on Drawings, but moment values are not given, the connections shall be designed for full moment capacities of members. Connections of beams with no reaction or axial loads given on Drawings shall be made to conform to Specifications for Design, Fabrication and erection of Structural Steel for Buildings. Composite beam reaction shall be modified in accordance with Drawings.

C. Connections for beams at columns shall have capacity for bracing force (axial load) given on Drawings (or determined at 2 percent of allowable axial load on column for unbraced floor to floor height) in addition to beam reactions. Symmetrical connections shall be required here, unless it can be shown by calculations that 1 sided or eccentric type connection is adequate.

D. Single shear plate type connections, may be permitted as an option at beam to beam connections resisting shear only.

E. Bolted connections shall be made with high-strength bolts unless shown otherwise. Friction type bolts shall be required at lateral load resisting moment and braced frames. Unfinished bolts shall not be used except where indicated. Surface of joints for welded or high-strength bolted connections shall comply with the requirements of joint surfaces and contact surfaces within friction-type joints.

F. Unless otherwise shown on Drawings, grade of connection material shall be same as that of connecting member, unless it can be shown by calculations that lower grade steel can be used.

G. Where specific details are shown on Drawings, the alternate details proposed by the fabricator shall be accepted only at the discretion of Engineer.

H. Unless shown otherwise on Drawings, the splices in columns or beams shall be made with complete penetration welds to develop full capacity of member locations and shall be subject to Engineer's review.

I. Unless otherwise shown on Drawings, welds in built-up members shall be continuous and shall be designed to transfer stress caused by forces on members framing into the built-up members. Stiffeners inside box columns or at W shape columns may be required in conformance with AISC specifications section 1.15.5, unless specifically omitted on Drawings or if shown by calculations that stiffener can be omitted.

2.5 HOLES

A. Cut, drill, or punch holes at right angles to the surface of the metal. Do not make holes or enlarge existing holes by burning.

B. Holes in base or bearing plate shall be drilled.

C. Provide holes in members to permit connecting Work of other trades.

D. Holes shall be clean-cut without torn or ragged edges.

E. Remove outside burrs resulting from drilling or reaming operations with a tool making a 1/16 inch bevel.

2.6 BOLTING

A. General (Not including high-strength):

1. Drive bolts into the holes without damaging the thread. Protect bolt heads from damage during driving.

2. Bolt heads and nuts shall rest squarely against the metal.

3. Where bolts are to be used on beveled surface having slopes greater than 1 to 20 with a plane normal to the bolt axis, beveled washers shall be provided to give full bearing to the head or nut.

4. Upset bolt threads to prevent the nuts from backing off.

B. Unfinished Bolts:

1. Unfinished bolts shall be of the length that shall extend through but no more than 1/4 inch beyond the nuts.

2. Bolt heads and nuts shall be drawing tight against Work.

3. Bolt heads shall be tapped with a hammer while the nut is being tightened. After having been finally tightened, bolt threads shall be upset to prevent the nuts from backing off.

C. High Strength Bolting:

1. Assemble joints in conformance with Specifications for Assembly of Structural Joints Using High Strength Steel Bolts, as approved by Research Council on Riveted and Bolted Structural Joints of Engineering Foundation.

2. Tighten bolts with impact wrenches to a torque not less than recommended for size of bolt.

3. Contact surface of joints shall be free of paint, lacquer, or other friction reducing coatings.

## 2.7 MISCELLANEOUS

A. Load indicator washers as manufactured and licensed by Cooper and Turner or Bethlehem Steel may be used for the field installation of the high-strength bolts, as approved by City of Los Angeles Department of Building and Safety. Load indicator washers may not be substituted for required washer, but may be used in conjunction with the required washers. After bolts in a joint are snugged to bring the members into close contact, tightening shall progress from the most rigid part to the free edges until the load indicators on bolts are closed to the required gap of 0.015 inch under bolt heads or 0.010 inch under the nuts. Do not completely close the gap to prevent overtightening and damage to the bolts.

B. Tension set or load indicator bolts, nuts, and washers as manufactured by Cold Form Specialties or Bethlehem Steel may be used for field installation of the high-strength bolts. In multi-bolt joints, the nuts shall be tightened in stages without breaking the spline in them until the final stage, to minimize slackening of the installed bolts.

## 2.8 WELDED CONNECTIONS

A. Do not begin structural welding until joint elements are bolted or tacked in intimate contact and adjusted to dimensions shown, with allowance for weld shrinkage that is expected. Weld heavy sections and those having a high degree of restraint with low hydrogen type electrodes. No members are to be spliced without prior review by Engineer.

B. Weld in conformance with AWS D1.1/D1.1M.

1. Welds exposed to view shall have as-welded surfaces that are continuous, smooth, and uniform. Radii shall be true, and consistent from weld to weld. Finishing or grinding may be required where clearances or fit of other items may so necessitate.

C. Perform intermittent welding, continuous welding, and straightening of built-up sections to minimize internal stresses. Built-up sections assembled by welding shall be free of warpage. Each axis shall have true alignment.

D. Welds not specified shall be continuous fillet welds. Use minimum fillet in conformance with AWS.

E. Clean surfaces to be welded of paint, grease, loose scale, and foreign matter. Clean welds each time electrode is changed or a new pass started. Chip clean burned or flame cut edges before depositing welds.

F. Same electrode may be used with various thickness of plates, but change current used and number of passes made proportionately.

G. After being deposited, brush welds with wire brushes. Welds shall exhibit uniform section, smoothness of welded metal, feather edges without undercuts or overlays, and freedom from porosity and clinkers. Visual inspection at edges and ends of fillets and butt joint welds shall indicate good fusion with penetration into base metal.

H. During assembling and welding, keep parts straight and in close contact. Take precautions to minimize "lock-up" stress and distortion due to heat. Do not weld during windy conditions unless wind protection is provided. Cut-out and replace welds found defective.

I. The maximum space between pieces or members to be butt welded shall not exceed 1/4 inch. Bevel pieces or members up to 3/8 inch thickness to form single or double "Vee" before being welded. Bevel pieces over 3/8 inch thickness to form a double "Vee" whenever possible. Lay and size fillet welds as shown. Measure only effective portion of fillet welds. Maximum space between pieces or member to be fillet welded shall not exceed 1/16 inch.

J. At groove welds between thick plates or between plates and thick members (generally greater than 3 inches plates), preheating temperatures higher than AWS minimums may be required to prevent lamellar tearing or weld cracking. Peening of weld passes, except the root pass and last pass, may be required to prevent lamellar tear or weld cracking.

2.9 FINISHING

A. General:

1. Steel, painted, and unpainted iron materials furnished shall be cleaned of rust, scale, and grease.

2. Structural steel not to receive galvanized coating or spray-on fireproofing, shall be given 1 shop coat of an approved rust inhibitive metal primer. Cleaning method for painted steel shall conform to SSPC-SP 3.

a. Where steel is scheduled to be painted, paint in conformance with PAINTING FOR EXTERIOR IMPROVEMENTS Section.

3. Apply primer to give a dry film thickness of 2.5 mils, except as specified for zinc-rich coating option.

4. Paint after shop Work has been completed. Paint with brushes, entire surface to be covered smoothly, with paint worked into joints.

5. No material shall be loaded for shipment until primer is fully dry.

6. Work arriving at Project Site which has been carelessly primed or painted shall be cleaned and given an additional coat of paint before being erected, except finish Work which shall be exposed to view shall be returned to shop for recleaning and repainting.

B. Steel surfaces in contact with aluminum shall receive an additional coat of paint consisting of 2 pounds of aluminum paste pigment (ASTM D962 Type II, Class B) per gallon of varnish meeting FS TT-V-81, Type II or equivalent.

C. Galvanizing:

1. Fabricated ferrous metal Work so specified shall be galvanized by hot-dip process, conforming to ASTM A123/A123M. Required hot-dip galvanizing shall be done after fabrication, in largest sections possible.

2. Items too large for available dip tanks shall be sprayed by approved methods, with molten zinc to coating thickness of 0.003 inch to 0.004 inch. Weight of the zinc coating per square foot of actual surface shall average not less than 2 ounces, no individual specimen shall show less than 1.8 ounces.

3. Shop galvanized metal Work necessitating field soldering or welding which removed original galvanizing shall be restored by field cold galvanizing with "Ferraloy", "Tim Easy Fluid", or "Galvaloy".

4. Bolts and screws for attachment of galvanized items shall be galvanized, or of non-corrodible material.

D. Finish painting in conformance with PAINTING FOR EXTERIOR IMPROVEMENTS Section.

## PART 3 - EXECUTION

### 3.1 FIELD MEASUREMENTS AND TEMPLATES

A. Secure field measurements required for fabrication and installation of Work.

B. Furnish templates for exact location of items to be embedded under other Work, with setting instructions required for installation of embedded item.

C. Verify conditions and measurements affecting Work at Project Site. Make sure that detrimental conditions are corrected before proceeding with installation.

### 3.2 ERECTION

A. Contractor shall be responsible for the design, strength, safety, and adequacy of temporary bracing and methods of handling, erection, and sequencing of erection of Work.

B. During construction:

1. The stability of the frame during erection shall be Contractor's responsibility.

2. Vertical and horizontal temporary bracing may be required to diaphragm lateral forces to the lateral force resisting structural elements. Deviation from this recommended procedure is subject to Engineer's review.

C. Temporary erection facilities:

1. Provide temporary braces, guys, connections, supports, flooring, planking, Work platforms, scaffolding and other facilities necessary for the safe erection of Work, and the support and bracing of erection equipment.

2. As erection progresses, Work shall be connected to safely resist dead load, wind, and erection forces.

3. Temporary bracing shall be introduced wherever necessary to safely resist loads to which the structure may be subjected, including loads of erection equipment and its operation. Such bracing shall be left in place as long as may be required until, as a minimum, after the permanent structure is capable of resisting imposed loads.

D. Set base plates and bearing plates level to correct elevations and support temporarily on steel wedges, shims, leveling devices, or as shown on Drawings, until corresponding supported member has been positioned, plumbed and anchor-bolted. Do not grout column base plates until beams, girders, and trusses are permanently anchored to column.

E. Erect and install structural steel in conformance with the approved shop drawings.

F. Align, level, and adjust members prior to final fastening. Bearing surfaces and surfaces that shall be in permanent contact shall be cleaned prior to final assembly of members.

G. Fasten compression member splices only after abutting surfaces have been brought completely into contact. Clean bearing surfaces prior to final assembly of members.

H. Oxygen cutting in the field shall be done only with prior written permission of Engineer.

I. Bolted Field Connections at Supports:

1. Standard bolts shall be of a length that shall extend not less than 1/4 inch beyond the nuts. Enter bolts into holes without damaging the threads.

2. Correct poor matching of holes by drilling to next larger size and use of larger size bolt. Obtain written approval before proceeding with corrective Work.

3. For high-strength bolts, use specified pre-calibrated bolts or bolts with direct tension indicators; install bolts in conformance with manufacturer's written instructions, engaging both the bolt and the nut and driven until the torque control groove of the bolt shears off, or until the indicator element yields. Tensioning of group of bolts shall be done first to snug tight condition and subsequently in proper sequence to obtain required tension.

J. Field Welding:

1. Welding operations and the welds shall conform to the applicable provisions of AWS Code, as modified by UBC Standard 27-6, Structural Welding.

2. Each welder working on Project shall be assigned an identification symbol or mark. Each welder shall make or stamp his or her identification symbol at each completed make.

3. Allow for weld shrinkage so that welded connected members shall be aligned and level after completion of the welding Work.

K. Weld shear connectors to supports through decking units in conformance with manufacturer's written instructions. Do not weld shear connectors through 2 layers (lapped ends) of decking units. Weld only on clean dry deck surfaces. Space and align shear connectors as shown on Drawings.

L. Erection tolerances:

1. Dimensional tolerances as stated by AISC Code of Standard Practice Paragraph 6.4 and Frame tolerances as stated by AISC Code of Standard Practice Paragraph 11, shall be considered the minimum acceptable standard for structural framing members except that at elevator shafts, the cumulative tolerances of columns and beams around the shafts shall not exceed 1 inch toward the shaft.

2. On shop drawings submitted for review for architectural metal Work, exposed structural framing members or framing members designed to receive exposed architectural metal Work, Engineer may indicate closer tolerances, which shall be acceptable and binding upon Contractor.

M. After erection, clean exposed surfaces of field connections, unpainted areas adjacent to field connections and damaged areas in shop coat to the same standards as required for the shop coat and paint with the same primer used in the shop coat.

N. Survey:

1. Make a survey of actual column locations immediately upon the completion of every third tier of steel and promptly submit same to Engineer.

2. Survey shall include tier below.

3. Should column locations carry beyond the allowable tolerances, take necessary corrective measures and modify details or procedures as required and approved.

O. Corrective Work:

1. Members or assemblages of Work having fabrication errors, or which exceed permissible tolerances, or which have errors or deformations preventing assembly and fitting of parts, shall be reported immediately to Engineer before incorporation in the finished Work.

2. Such members or assemblages shall be corrected if permitted by Engineer, or otherwise shall be replaced.

3. Submit drawings showing the errors and obtain Engineer's acceptance prior to performing any correctiveork.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Testing and inspecting structural steel Work.

B. For Work shown on Drawing No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

## 1.2 RELATED SECTIONS

A. Section 05 05 14 - Treating Damaged Galvanizing

B. Section 05 12 02 - Structural Steel

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires testing and inspection of structural steel Work.

## 1.4 REFERENCES

A. AISC 348 - Specification for Structural Joints Using High-Strength Bolts.

B. ASTM A435/A435M - Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates.

C. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.

D. AWS D1.1/D1.1M - Structural Welding Code - Steel.

PART 2 - PRODUCTS

2.1 SOURCE QUALITY CONTROL

A. Source Quality Control:

1. Tests are waived for steel identified by heat number, accompanied by mill analyses and mill test reports, and properly tagged with an Identification Certificate so as to be readily identified for conformance with applicable American Society for Testing and Materials (ASTM International) Standards.

2. Unidentified Materials:

a. Yield strength up through 36,000 pounds per square inch (psi): Make 1 set of tension tests and 1 set of bend tests for each 20 tons or part thereof of each heat.

b. Yield strength greater than 36,000 psi: Make 1 set of tension tests and 1 set of bend tests for each piece.

c. Additional tests may be required when deemed necessary by Engineer or City of Los Angeles Department of Building and Safety and shall be performed at no additional cost to Department.

3. Furnish certified copy of manufacturer's test reports stating that high strength bolts and heat-treated steel structural bolts meet the requirements of ASTM F3125/F3125M.

a. Department Testing Laboratory (Test Lab) shall take samples and test not less than 3 samples including nuts, bolts, and washers from each lot and each size of each lot.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Tests and inspections of structural steel Work performed by the fabricator shall be verified by Test Lab in conformance with requirements of Chapter 17 Special Inspections and Tests of International Code Council (ICC) and City of Los Angeles Building Code. Provide Test Lab with the submittals under STRUCTURAL STEEL Section. Allow Test Lab free access to places whether on or off Project Site where materials are stored or services are performed, and to Project Site during times of fabrication and erection.

2. Each person installing connections shall be assigned an identifying symbol or mark and shop and field connections shall be so identified so that Inspector can refer to the person making the connection.

3. Testing and inspection by Test Lab shall include, but is not limited to, the following:

   a. High strength bolts shall be continuously visually inspected. At least 10 percent of high-strength bolted connection shall be tested at random for bolt tightness using procedure described in AISC 348.

   b. Shop and field welded connections shall be continuously visually inspected except for welding done in a City of Los Angeles Department of Building and Safety licensed shop. In addition, field and shop testing using ultrasonic or magnetic particle method shall be done as noted on Drawings.

4. Ultrasonic Shop Welding Inspection:

   a. Material in the designated location shall be checked at the shop for internal imperfections by ultrasonic testing prior to fabrication, in conformance with ASTM A435/A435M. Defects found may be repaired by welding subject to Engineer's approval.

   b. Complete penetration and partial penetrations shop welds in designated locations shall be ultrasonically tested.

c. Test Lab test reports shall include types and locations of defects found during inspections, and the measure required and performed to correct such defects, and statements of final approval of welding shop connections.

5. Ultrasonic Field Test Procedures:

   a. Ultrasonic testing shall be performed conforming to AWS D1.1/D1.1M by a specifically trained, qualified technician, who shall operate the equipment, examine the weld and maintain a record of welds examined, defects found, and disposition of each defect. Defective welds shall be repaired and costs, including retesting of defective welds, shall be at sole cost and expense of Contractor.

   b. Ultrasonic testing shall also be done in the vicinity of groove weld in moment connections and other weldments as designated on Drawings to detect lamellar tearing.

   c. The ultrasonic instrumentation shall be calibrated by the technician to evaluate the quality of the weld in conformance with AWS D1.1/D1.1M.

   d. When ultrasonic indications arising from the weld root can be interpreted as either a weld defect or the backing strip, the backing strip shall be removed at sole cost and expense of Contractor and the weld retested. If no root defect is indicated on this retest and no significant amount of the base and weld metal has been removed, no further repair or welding shall be required. If a defect is indicated, it shall be repaired and retested as specified.

6. Testing by Fabricator:

   a. When mill reports identifying heat or melt numbers and analysis are not available, tension and bed tests of the materials may be required by Test Lab.

   b. Test specimens shall be taken by the fabricator under the direction of Test Lab and shall be machined by Test Lab to dimension as required by the related applicable standard ASTM specifications.

7. Field welding shall be performed in the presence of a City of Los Angeles Deputy Inspector.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Shop fabricated miscellaneous metal fabrications, steel, and aluminum items

B. Fasteners

C. Loose bearing and leveling plates

D. Miscellaneous framing and supports

E. Metal bar gratings

F. Loose steel lintels

G. Floor plates

H. Metal finishes

I. For Work shown on Drawing No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

## 1.2 RELATED SECTIONS

A. Section 05 05 14 - Treating Damaged Galvanizing

B. Section 05 52 03 - Guardrails

C. Section 09 90 01 - Painting for Exterior Improvements

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires metal fabrications.

## 1.4 REFERENCES

A. ASME B18.6.3 - Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series).

B. ASME B18.21.1 - Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers (Inch Series).

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

G. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.

H. ASTM A194/A194M - Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.

I. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

J. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes.

K. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

L. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

M. ASTM A435/A435M - Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates.

N. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

O. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

P. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.

Q. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

R. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings.

S. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings.

T. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

U. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.

V. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire.

W. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

X. ASTM D962 - Standard Specification for Aluminum Powder and Paste Pigments for Paints.

Y. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

Z. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

AA. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.

BB. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

CC. AWS D1.1/D1.1M - Structural Welding Code - Steel.

DD. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel.

EE. AWS D1.2/D1.2M - Structural Welding Code - Aluminum.

FF. FS TT-V-81 - Varnish: Mixing, for Aluminum Paint.

GG. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172.

HH. NAAMM MBG 531 - Metal Bar Grating Manual.

II. NAAMM MBG 532 - Heavy Duty Metal Bar Grating Manual.

JJ. SSPC-PA 1 - Shop, Field, and Maintenance Coating of Metals.

KK. SSPC-SP 1 - Solvent Cleaning.

LL. SSPC-SP 2 - Hand Tool Cleaning.

MM. SSPC-SP 3 - Power Tool Cleaning.

NN. SSPC-SP 7 - Brush-Off Blast Cleaning.

1.5 SUBMITTALS

A. Submit mill test reports certifying that materials meet requirements of standards listed in References Article of this Section.

1. Heat and melt numbers and mill test report numbers.

2. Size

3. Type and grade of material, identified by ASTM Standard Specification number

4. Color coding for shop drawing requirements.

B. Submit the following to Engineer for review and approval:

1. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

a. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

b. Design fabrications to meet actual installation conditions verified at Project Site.

c. Detail minor connections and fastenings not shown or specified to meet required conditions. Include detailed sequence plan for shop and field welding that minimizes locked-in stresses and distortions.

d. No change shall be made on shop drawings after shop drawings have been approved, except by written consent or direction of Engineer.

e. Detail drawings shall show grade of steel, identification marks on members, dimensions, size, weight, orientation, and location of each member and setting elevation of base plates and bearing plates. Identify connections and welds, including welding sequences and types, sizes, and extent of weld.

f. The shop drawings shall show details of permitted options proposed, details of connections, direction of rolling plates, sequence of field and shop assembly, welding sequence and procedures, location and details of welds, and the location of temporary support used for assembly.

2. Welders' Certificates: Submit certification for welders employed on Project, verifying AWS qualification within the previous 12 months.

3. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

C. Submit manufacturer's literature and certification that paints and coatings meet South Coast Air Quality Management District (SCAQMD) Volatile Organic Compounds (VOC) requirements.

1. Refer to PAINTING FOR EXTERIOR IMPROVEMENTS Section for priming and painting requirements.

D. Submit name of independent test laboratory to perform inspection and testing.

E. Submit results of independent test laboratory’s inspections and tests.

F. Submit fabricator's test results of materials prior to using materials for fabrication.

1.6 QUALITY ASSURANCE

A. Inspection: Engineer reserves the right to inspect the manufacture or fabrication. Engineer's inspection of Work does not relieve Contractor of the responsibility for Work. Errors or faults that are discovered during fabrication shall be corrected by Contractor prior to installation.

B. Welders: Welders shall be qualified in conformance with AWS D1.1/D1.1M and AWS D1.3/D1.3M shall be City of Los Angeles Department of Building and Safety certified.

C. Mill Tests: Prepare mill tests for specified material.

D. Field welding shall be performed in presence of a City of Los Angeles Registered Deputy Inspector.

E. Design metal fabrications under direct supervision of a professional structural engineer experienced in design of this Work and licensed in the State of California.

F. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect materials from damage during shipping, handling, and storage on Project Site. Steel showing dents, creases, deformations, weathering, or other defects is not acceptable.

B. Store metals above ground on platforms, skids, or other supports, and keep free from dirt, grease, and other foreign material. Protect metals from corrosion while stored.

1. Store materials in a location and in a manner to avoid damage. Stacking shall be done in a way which shall prevent bending. Store metal components and materials in a clean, dry location. Cover with waterproof paper, tarpaulin, or polyethylene sheeting in a manner that shall permit circulation of air inside the cover.

C. Deliver bolts, nuts, washers, and studs not part of an approved fabrication, to Project Site in the original labeled containers and do not transfer into unlabeled containers.

D. Units weighing more than 5,000 pounds shall have the mass marked on the steel unit.

PART 2 - PRODUCTS

2.1 MATERIALS - STEEL

A. Steel Plates, Shapes, and Bars: ASTM A36/A36M, unless shown otherwise on approved shop drawings or this Section. Plates shall be furnished to qualify for ultrasonic examination in conformance with ASTM A435/A435M.

B. Steel Tubing: ASTM A500/A500M, cold-formed, Grade B, Fy = 46 ksi or ASTM A501/A501M hot formed structural tubing. For exterior installations, provide tubing with hot-dip galvanized coating in conformance with ASTM A153/A153M.

C. Low to intermediate grade steel plates shall conform to ASTM A283/A283M.

D. Steel Pipe: ASTM A53/A53M, Grade as directed by Engineer Schedule 40, unless shown otherwise on Drawings.

E. Slotted Channel Framing: ASTM A1011, Grade 33.

F. Slotted Channel Fittings: ASTM A1011/A1011M.

G. Fasteners:

1. Bolts and nuts:

a. Bolts and nuts shall be American National coarse-thread series.

b. Unfinished bolts shall conform to ASTM A307.

2. Washers and Load Indicator Devices:

a. Plain washers shall conform to ASME B18.21.1.

b. Beveled washers shall be square, smooth, and sloped so that contact surfaces of bolt head and nut are parallel.

c. The diameter of hole of square-beveled washer shall be 1/16 inch greater than the bolt size for bolts larger than 1 inch.

d. Install washers on nut side of bolt for torquing as required.

3. Anchor Bolts: ASTM F1554, Grade 36.

4. Machine Screws: ASME B18.6.3.

5. High Strength Bolts: ASTM F3125/F3125M.

2.2 MATERIALS - ALUMINUM

A. Extruded Aluminum: ASTM B221, 6063 alloy, T6 temper.

B. Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.

C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.

D. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.

E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.

F. Aluminum-Alloy Die Castings: ASTM B85/B85M.

G. Bolts, Nuts, and Washers: Stainless steel, Type 304 or 316 in conformance with ASTM F593.

H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

## 2.3 MATERIALS - STAINLESS STEEL

A. Stainless Steel Plates: ASTM A276/A276M, Type 316 (for exterior and highly corrosive environment).

B. Anchor Bolts and Nuts: ASTM A193/A193M and ASTM A194/A194M

C. Pipe: ASTM A269/A269M

D. Finish: As noted on Drawings.

## 2.4 FABRICATION

A. General:

1. Metal items shall be fabricated and finished in accordance with Drawings and approved shop drawings. Verify measurements before fabrication.

2. Welding procedures and inspection shall be in conformance with AWS D1.1/D1.1M. Welding shall be continuous along the area of contact expect where tack welding is called for on Drawings. Welds shall be ground smooth.

3. Galvanize fabricated ferrous items after fabrication.

4. Metal fabrications showing injurious defects, weak spots, imperfections in Work, or otherwise not conforming to Specifications or Drawings shall be rejected.

B. Fit and shop assemble items in largest practical sections, for delivery to Project Site.

C. Fabricate items with joints tightly fitted and secured.

D. Wire brush material, clean off loose mill scale and rust, and straighten by methods that shall not injure the steel prior to fabrication. Remove twists or bends after punching or working component parts of a member before the parts are assembled. Produce finished members free from twists, bends, or open joints when installed.

E. Shearing, flame cutting, and chipping shall be done accurately.

F. Assembled pieces shall be taken apart, if necessary, for the removal of burrs and shavings produced by the reaming operation.

G. Parts not completely bolted in the shop shall be secured by temporary bolts, insofar as practicable, to prevent damage in shipment and handling.

H. Use of gas or plasma cutting torch is allowed where the metal being cut is not stressed during the operation, and provided stresses are not transmitted through a flame-cut surface. Make cuts with smooth regular contour. Deduct 1/8 inch from width of cut edges to determine effective width of members that are cut. Make radius of reentrant cuts as large as possible, but 1 inch minimum.

I. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

J. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

## 2.5 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required.

## 2.6 LOOSE STEEL LINTELS

A. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for opening and recesses in masonry walls and partitions at locations indicated on Drawings.

B. Weld adjoining members together to form a single unit where indicated on Drawings.

C. Size loose lintels for equal bearing of one inch per foot of clear span but not less than 8 inches bearing at each side of openings, unless otherwise indicated on Drawings.

## 2.7 MISCELLANEOUS METAL ITEMS

A. Miscellaneous Framing and Supports: Provide steel framing and supports for applications indicated which are not a part of structural steel framework, as required to complete Work.

1. Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.

2. Equip units with integrally welded anchors for casting into concrete or building into masonry. If units are installed after concrete is placed, furnish inserts. Unless otherwise indicated on Drawings, space anchors 24 inches on center and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch by 8 inches long.

B. Miscellaneous Steel Trim: Provide shapes and sizes indicated for profiles shown on Drawings. Unless otherwise indicated on Drawings, fabricate units from structural steel shapes, plates, and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings, and anchorages as required for coordination for assembly and installation with other Work.

## 2.8 SHELF AND LEDGER ANGLES

A. Fabricate shelf and ledger angles from steel angles of sizes indicated on Drawings and for attachment to concrete framing. Provide slotted holes to receive 3/4 inch bolts, spaced not more than 6 inches from ends and not more than 24 inches on center, unless otherwise indicated on Drawings.

B. For cavity walls, provide vertical channel brackets to support shelf/ledger angles from back-up masonry and concrete. Align expansion joints in angles with indicated expansion joints in cavity wall exterior wythe.

C. Furnish wedge-type concrete inserts, complete with fasteners, for attachment of shelf angles to cast-in-place concrete.

## 2.9 METAL BAR GRATINGS

A. General: Produce metal bar gratings of description indicated in conformance with National Association of Architectural Metal Manufacturers (NAAMM) marking system that complies with the following:

1. Metal Bar Grating Standard: Metal Bar Grating Manual published in NAAMM MBG 531.

2. Heavy Duty Metal Bar Grating Standard: Heavy Duty Metal Bar Grating Manual published in NAAMM MBG 532.

B. If gratings are located in walking surfaces, gratings shall have spaces no greater than 1/2 inch wide in one direction. If gratings have elongated openings, then they shall be placed so that the long dimension is perpendicular to the dominant direction of travel.

C. Fabricate steel gratings to comply with requirements as indicated on Drawings.

D. Traffic Surface for Steel and Aluminum Bar Gratings: Plain, unless otherwise indicated on Drawings.

E. Steel Finish: shop prime paint applied in conformance with manufacturer's standard practice.

F. Aluminum Finish: Mill (as fabricated), unless otherwise indicated on Drawings.

G. Fabricate removable gratings sections with banding bars attached by welding to entire perimeter of each section. Include anchors and fasteners of type indicated, or if not indicated, as recommended by manufacturer, for attachment to supports.

1. Heavy Duty Grating: Provide not less than 4 anchors blocks, 1/4 minimum thickness, for each section of grating composed of bearing bars over 3/16 inch in thickness, with each block shop-welded to 2 bearing bars.

2. Non-Heavy Duty Grating: Provide not less than 4 saddle clips for each grating section composed of rectangular bearing bars 3/16 inch or less in thickness and spaced not less than 15/16 inch on center, with each clip designed and fabricated to fit over 2 bearing bars. Furnish threaded bolts with nuts and washers for each clip required, unless otherwise indicated on Drawings.

H. Attach toe plates to grating by welding, unless otherwise indicated on Drawings. Toe plate height: 4 inches, unless a greater height indicated on Drawings.

I. Fabricate cutouts in grating sections for penetrations indicated. Arrange layout of cutouts to permit grating removal without disturbing items penetrating gratings.

1. Edge band openings in grating that interrupt 4 or more bearing bars with bars of same size and material as bearing bars.

2. Do not notch bearing bars at supports to maintain elevation.

J. Manufacturers: Alabama Metal Industries Corp., Barnett/Bates Corp., and IKG Industries.

2.10 FLOOR PLATE

A. Fabricate raised pattern floor plates from rolled steel floor plate in conformance with ASTM A786/A786M of thickness and pattern indicated on Drawings. If not indicated, pattern as selected from manufacturer's standard patterns.

B. Abrasive Surface Floor Plate: Manufacturer's standard abrasive granules, rolled into surface of steel plate, where indicated on Drawings.

C. Include steel angle stiffeners and fixed and removable sections as indicated on Drawings. Provide 2 steel bar drop handles for lifting plates, 1 at each end of each removable section.

2.11 STEEL AND IRON FINISHES

A. General:

1. Steel, painted, and unpainted iron materials furnished shall be cleaned of rust, scale, and grease.

2. Remove oil, grease, and similar contaminants in conformance with SSPC-SP 1.

3. Remove loose rust, scale, spatter, slag, and other deleterious materials in conformance with SSPC-SP 2, SSPC-SP 3, or SSPC-SP 7.

4. Apply primer to give a dry film thickness of 2.5 mils, except as specified for zinc-rich coating option.

5. Paint after shop Work has been completed. Paint with brushes, entire surface to be covered smoothly, with paint worked into joints.

6. No material shall be loaded for shipment until primer is fully dry.

7. Materials arriving at Project Site with damaged primer or paint shall be cleaned and given an additional coat of paint before being assembled, except finish Work which shall be exposed to view shall be returned to shop for re-cleaning and repainting.

B. Painting: Immediately after surface preparation, apply structural steel primer paint in conformance with manufacturer's written instructions and at a rate to provide dry film thickness of not less than 3.0 mils. Use painting methods that result in full coverage of joints, corners, edges, and exposed surfaces. Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection.

C. Where steel is scheduled to be painted, apply paint in conformance with PAINTING FOR EXTERIOR IMPROVEMENTS Section.

D. Steel surfaces in contact with aluminum shall receive an additional coat of paint consisting of 2 pounds of aluminum paste pigment (ASTM D962 Type II, Class B) per gallon of varnish meeting FS TT-V-81, Type II.

E. Galvanizing: For those items indicated for galvanizing, apply zinc-coating in compliance with the following requirements:

1. Ferrous metal Work, both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forced shapes, plates, bars, and strip 0.0299 inch thick and heavier shall be galvanized by hot-dip process, with larger items galvanized in conformance with ASTM A123/A123M and smaller hardware (that can be centrifuged) galvanized in conformance with ASTM A153/A153M. Required hot-dip galvanizing shall be done after fabrication, in largest sections possible.

2. Items too large for available dip tanks shall be sprayed by approved methods, with molten zinc to coating thickness of 0.003 inch to 0.004 inch. Weight of the zinc coating per square foot of actual surface shall average not less than 2 ounces; no individual specimen shall show less than 1.8 ounces.

3. Bolts and screws for attachment of galvanized items shall be galvanized, or of non-corrodible material.

2.12 ALUMINUM FINISH

A. Mill finish (as fabricated), unless otherwise indicated on Drawings.

2.13 SOURCE QUALITY CONTROL

A. Tests are waived for steel identified by heat number, accompanied by mill analyses and mill test reports, and properly tagged with an Identification certificate so as to be readily identified for conformance with applicable ASTM Standards.

1. Unidentified materials to be tested by independent test laboratory:

    a. Yield strength less than or equal to 36,000 psi: 1 set of tension tests and 1 set of bend tests for each 20 tons or part thereof of each heat.

    b. Yield strength greater than 36,000 psi: 1 set of tension tests and 1 set of bend tests for each piece.

    c. Additional tests may be required by Engineer or City of Los Angeles Department of Building and Safety.

B. Shop inspections may be waived for manufacturer fabricated assemblies delivered to Contractor for installation as preassembled units.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive Work.

B. Correct detrimental conditions before proceeding with installation.

### 3.2 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### 3.3 INSTALLATION

A. Install metal fabrication items in accordance with Drawings and approved shop drawings.

B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project Site.

C. Install items plumb and level, accurately fitted, free from distortion or defects.

D. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

E. Field weld components as indicated on Drawings.

F. Perform field welding in conformance with AWS D1.1/D1.1M or appropriate AWS standard for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding Work, and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surfaces matches those adjacent.

G. Obtain approval from Engineer prior to site cutting or making adjustments not scheduled.

## 3.4 SETTING LOOSE PLATES

A. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.

B. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

## 3.5 HOLES

A. Prepare required holes in steel members for attachment or passage of Work of other trades.

B. Hole burning to make or enlarge holes is allowed only with prior approval of Engineer. Enlarge holes only by reaming.

C. Cut, drill, or punch holes at right angles to the surface of the metal.

D. Holes shall be clean-cut without torn or ragged edges.

E. Remove outside burrs resulting from drilling or reaming operations with a tool making a 1/16 inch bevel.

F. Punch, drill, or ream holes for anchor bolts in base and bearing plates. Do not make or enlarge the holes by burning except for grouting holes in column bases.

G. Where the steel thickness is equal to or less than diameter of the bolt plus 1/8 inch, holes may be punched 1/16 inch larger than the nominal diameter of the bolt.

H. Where the steel is thicker than the diameter of the bolt plus 1/8 inch, the holes shall be drilled or sub-punched and reamed. Diameter of sub-punched holes, and the drill for sub-punched holes, shall be 1/16 inch smaller than the nominal diameter of bolt to be installed.

I. Precisely locate finished holes to ensure passage of bolts through steel assemblies without drifting. Poor matching of holes is cause for rejection.

3.6 BOLTING

A. General (Not Including High-Strength):

1. Drive bolts into the holes without damaging the thread. Protect bolt heads from damage during driving.

2. Bolt heads and nuts shall rest squarely against the metal.

3. Where bolts are to be used on beveled surface having slopes greater than 1 to 20 with a plane normal to the bolt axis, beveled washers shall be provided to give full bearing to the head or nut.

4. Upset bolt threads to prevent the nuts from backing off.

B. Unfinished Bolts:

1. Unfinished bolts shall be of the length that shall extend through but no more than 1/4 inch beyond the nuts.

2. Bolt heads and nuts shall be drawn tight against Work.

3. Bolt heads shall be tapped with a hammer while the nut is being tightened. After having been finally tightened, bolt threads shall be upset to prevent the nuts from backing off.

C. Bolted Field Connections at Supports:

1. Standard bolts shall be of a length that shall extend not less than 1/4 inch beyond the nuts. Enter bolts into holes without damaging the threads and bolt heads

2. Bolt heads and nuts shall rest squarely against the metal.

3. Where bolts are to be used on beveled surface having slopes greater than 1 to 20 with a plane normal to the bolt axis, beveled washers shall be provided to give full bearing to the head or nut.

4. Upset bolt threads to prevent the nuts from backing off.

5. Correct poor matching of holes by drilling to next larger size and use of larger size bolt. Obtain written approval from Engineer before proceeding with corrective Work.

## 3.7 WELDED CONNECTIONS

A. Do not begin welding until joint elements are bolted or tacked in intimate contact and adjusted to dimensions shown on Drawings, with allowance for weld shrinkage that is expected. Weld heavy sections and those having a high degree of restraint with low hydrogen type electrodes. No members shall be spliced without prior approval by Engineer.

B. Weld in conformance with AWS D1.1/D1.1M.

1. Welds exposed to view shall have as-welded surfaces that are continuous, smooth, and uniform. Radii shall be true and consistent from weld to weld. Finishing or grinding may be required where clearances or fit of other items may require.

C. Perform intermittent welding, continuous welding, and straightening of built-up sections to minimize internal stresses. Built-up sections assembled by welding shall be free of warpage. Each axis shall have true alignment.

D. Welds not specified shall be continuous fillet welds. Use minimum fillet in conformance with AWS requirements.

E. Clean surfaces to be welded of paint, grease, loose scale, and foreign matter. Clean welds each time electrode is changed or a new pass started. Chip clean burned or flame cut edges before depositing welds.

F. Same electrode may be used with various thicknesses of plates, but change current used and number of passes made proportionately.

G. After being deposited, brush welds with wire brushes. Welds shall exhibit uniform section, smoothness of welded metal, feather edges without undercuts or overlays, and freedom from porosity and clinkers. Visual inspection at edges and ends of fillets and butt joint welds shall indicate good fusion with penetration into base metal.

H. During assembling and welding keep parts straight and in close contact. Take precautions to minimize "lock-up" stress and distortion due to heat. Do not weld during windy conditions unless wind protection is provided. Cut-out and replace welds found to be defective.

I. The maximum space between pieces or members to be butt welded shall not exceed 1/4 inch. Bevel pieces or members up to 3/8 inch thickness to form single or double "Vee" before being welded. Bevel pieces over 3/8 inch thickness to form a double "Vee" whenever possible. Lay and size fillet welds as shown on Drawings. Measure only effective portion of fillet welds. Maximum space between pieces or members to be fillet welded shall not exceed 1/16 inch.

3.8 CORRECTIVE WORK

A. Members or assemblages of Work having fabrication errors, or which exceed permissible tolerances, or which have errors or deformations preventing assembly and fitting of parts, shall be reported immediately to Engineer before incorporation in the finished Work.

B. Such members or assemblages shall be corrected if permitted by Engineer, otherwise, they shall be replaced at Contractor’s sole cost and expense.

C. Submit drawings showing the corrections and obtain acceptance prior to performing any corrective Work.

3.9 REPAIR OF DAMAGED GALVANIZING

A. Repair damaged galvanizing in conformance with TREATING DAMAGED GALVANIZING Section.

## 3.10 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Tests and inspections by independent test laboratory shall include, but is not limited to, the following:

a. Shop and field welded connections shall be continuously visually inspected except for welding done in a City of Los Angeles Department of Building and Safety licensed shop.

b. Defects shall be corrected and a statement of final approval shall be received from Engineer before fabrications are installed.

## 3.11 CLEANING AND TOUCH-UP PAINTING

A. Touch-Up Painting of Steel Items: Immediately after erection, clean field welds, bolted connections, abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touch-up of field painted surfaces. Apply by brush or spray to provide a minimum dry film thickness of 3.0 mils.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Guardrails, as shown on Drawings and specified in this Section. Work shall include furnishing full fabrication drawings and structural calculations for the guardrails.

B. Work included in this Section: Ipe wood guardrail cap.

C. For Work shown on Drawing No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Guardrail bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.

B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

C. ASTM B247 - Standard Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings.

D. ASTM B429/B429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

E. ASTM E488/E488M - Standard Test Methods for Strength of Anchors in Concrete Elements.

F. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.

G. AWS D1.2/D1.2M - Structural Welding Code - Aluminum.

H. NAAMM AMP 500-06 - Metal Finishes Manual.

I. NAAMM AMP 521-01 - Pipe Railing Systems Manual.

1.5 SUBMITTALS

A. Samples: Attach product name, address of manufacturer, and/or supplier to each sample.

B. Samples for Verification: For each type of exposed finish required, prepared on components indicated below and of the same thickness and metal indicated for Work. If finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1. 6-inch- long sections of each distinctly different linear railing member, including hand-rails, top rails, posts, and balusters.

2. Fittings and brackets.

3. Assembled full size sample of railing system, made from full-size components, including top rail, wood cap, and posts. Show method of finishing members at intersections.

C. Product Data: Manufacturers' current catalog cuts, data sheets, and installation instructions.

D. Finish: 2 for each type and finish.

E. Test Report: 1 copy to be sent by testing laboratory directly to Engineer.

F. Shop Drawings:

1. Submit fabrication drawings to scale of entire length of guardrail including guardrail post, and guardrail at steps.

2. Verification: Verify measurements at Project Site. Show dimensions, sizes, thicknesses, gages, finishes, joining, attachments, and relationship of Work to adjoining construction. Where items must fit and coordinate with finished surfaces and constructed spaces, take measurements at Project Site and not from Drawings.

3. Coordination: Where concrete, masonry, or other materials must be set to exact locations to receive Work, furnish assistance, and direction necessary to permit other trades to properly locate their Work.

4. Welded Connectors, Concrete, or Masonry Inserts: Where required to receive Work, show exact locations and furnish such drawings to the trades responsible for installing the connectors or inserts.

5. Catalog Work Sheets: Show illustrated cuts of item to be furnished, scaled details, and dimensions.

    a. Structural calculations and drawings prepared and signed by an engineer registered in State of California, for review by Engineer.

G. Submit installer qualifications and experience.

1.6 QUALITY ASSURANCE

A. Installers Qualifications: Installers shall have experience working and installing guardrails on similar projects with regard to size and type of Project within the past 5 years.

B. Mock-Ups: A sample of fully assembled 4 foot long guardrail and Ipe guardrail cap shall be submitted for approval by Engineer. The mock-up shall show guardrail connection to the post and welding quality.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver fabricated units and components completely identified on shop drawings. Protect surfaces from damage during shipping. Inspect Work for damage upon delivery to Project Site. No materials with defects or scratches on exposed finishes shall be accepted.

B. Protection: Protect Work at Project Site from damage and from weather until installed and Work has been accepted.

C. Replacement: Replace damaged materials at no additional cost to Department.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify guardrail dimensions by field measurements before fabrication and indicate measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying Work.

B. Established Dimensions: Where field measurements cannot be made without delaying Work, establish dimensions and proceed with fabricating guardrails without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.9 COORDINATION

A. Coordinate installation of anchorages for guardrails. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project Site in time for installation.

1.10 SCHEDULING

A. Schedule installation so guardrails are mounted only on completed walls. Do not support temporarily by any means that does not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 DESIGN REQUIREMENTS

A. Guard railing shall be able to support a lateral force of 50 pounds per linear foot uniform load and 250 pounds at any single point without permanent set or damage in conformance with ASTM E935. Top rails shall be able to support minimum 300 pounds concentrated single point load applied at any point vertically or horizontally.

B. Thermal Movements: Provide guardrail that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss. Temperature Change (Range): 120 degrees Fahrenheit (F), ambient; 180 degrees F, material surfaces.

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

2.2 ALUMINUM GUARDRAIL MANUFACTURERS

A. Crane Veyor Corp.

2.3 BASIC MATERIALS AND ACCESSORIES

A. General: Provide metal free from pitting, seam marks, roller marks, stains, discolorations, and other imperfections where exposed to view on finished units.

B. Aluminum Anodized: Marine grade alloy and temper recommended by aluminum producer and finisher for type os use and finish indicated on Drawings, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum for required.

1. Extruded Bar and Tube: ASTM B221, alloy 6063-T5/T52.

2. Extruded Structural Pipe and Tube: ASTM B429/B429M, alloy 6063-T6.

3. Drawn Seamless Tube: ASTM B210/B210M, alloy 6063-T832.

4. Plate and Sheet: ASTM B209/B209M, alloy 6061-T6.

5. Die and Hand Forgings: ASTM B247, alloy 6061-T6.

6. Castings: ASTM B26/B26M, alloy A356-T6.

C. Fasteners: Bolts, nuts, screws, clips, washers, anchors, sleeves, setting templates, and any other fasteners necessary for proper erection of items shall be aluminum, unless otherwise indicated on Drawings.

D. Welding Materials, Fasteners, and Anchors:

1. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

2. Fasteners: Use fasteners fabricated from same basic metal as fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.

3. Provide concealed fasteners for interconnecting guardrail components and for attaching them to other Work, unless exposed fasteners are unavoidable or are the standard fastening method for guardrails indicated.

4. Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated on Drawings.

5. Cast-in-Place and Post-installed Anchors: Cast-in-place anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete, as determined by testing in conformance ASTM E488/E488M conducted by a qualified independent testing agency.

E. Ipe Guardrail Cap:

1. Lumber shall be naturally durable hardwood to be Ipe, Tabebuia lapacho species.

   a. Acceptable Sources:

      1) East Teak Fine Hardwoods, Inc., (800) 537-3369, {HL#18753480}

      2) Timber Holdings International, (414) 445-8989, www.ironwoods.com

      3) J. Gibson McIlvain Company, (800) 638-9100, {HL#18753478}.

      4) Advance Building Supplies, (404) 549-4840, https://abswood.com/

2. Moisture Content: Lumber shall be air dried, moisture content of 18 percent to 25 percent.

3. Surface Dimensions: Lumber shall be specified in actual dimensions, Finished Thickness by Finished Width by Finished Length, example NET 1.5 by 3.5 by 12 feet or in net dimensions.

   a. Deck lumber shall be S4S (surfaced four sides), E4E (eased edges), including field cut edges, unless otherwise indicated on Drawings. Edges shall be eased to a radius of 1/8-inch.

   b. Dimensional tolerances (measured at 25 percent moisture content) shall be plus or minus 0.125 inch in both width and 0.0625 inch in thickness.

   c. Lumber shall be precision cut to dimensions to exact profile as detailed and in accordance with approved shop drawings.

   d. Lumber shall be ordered in widths greater than the IPE rail dimentions to allow for cutting and shaping to required curved radius.

4. Sealer Coating: Lumber shall be end sealed on all sides and ends with Anchorseal wood sealer as manufactured by U.C Coatings Corporation, telephone (888) 363-2628, or Engineer-approved aqueous wax log sealer.

5. Mechanical Properties: The Ipe wood supplied shall meet or exceed mechanical properties as defined by Forest Products Laboratory (FPL) testing methods. The values for mechanical properties are as follows:

| MC Percent | Bending Strength | Modulus of Elasticity | Maximum Crush Strength |
|---|---|---|---|
| AD | 22,475 psi | 3,145,000 psi | 13,140 psi |

Janka side hardness: 3,595 pounds at 12 percent M.C.

Average air dry density: 56.7 to 59.3 pcf.

Basic specific gravity: 0.85-0.97.

6. Fire Rating: Lumber supplied shall be naturally fire resistant without the use of any fire resistant preservatives to meet National Fire Protection Association (NFPA) Class A and City of Los Angeles Building Code.

7. Grade: Lumber shall be standard premium grade, hand inspected, and selected:

   a. Lumber shall be graded both faces, and both edges.

   b. Lumber shall be straight grained, maximum slope of grain to be 1:10.

   c. Lumber shall be parallel cut without heart center or sap wood.

   d. Lumber shall be in sound condition, free from worm holes or knots.

   e. Allowable imperfections defined as natural drying checks, discoloration caused by weathering or chemical reaction, bow or spring which can be removed using normal installation methods and tools.

   f. None allowable imperfections are defined as longitudinal heart cracks, internal cracks, firm or soft sap wood, fungi affects (blue to gray, brown to red, white to yellow, or incipient decay), deformation (twisting or cupping) which cannot be removed during installation using normal installation methods and tools.

## 2.4 FABRICATION

A. Field Measurement: Make field measurements as required prior to fabrication and installation.

B. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly, coordination and installation. Guardrails shall be fabricated prior to delivery to Project Site.

C. Shop fabricate metal and welds to ensure that no non-ferrous oxides and impurities are impregnated into the final aluminum product. The fabrication process shall be free of any surface impurities to ensure no surface rust shall occur on the finish.

D. Provide all surfaces free of file marks, dents, hammer marks, wire edges, or any unsightly surface defects.

E. Fabricate items with joints neatly fitted and properly secured.

F. Non-welded Connections: Fabricate guardrails by connecting members with concealed mechanical fasteners and fittings, unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints. Fabricate splice joints for field connection using an epoxy structural adhesive where this is manufacturer’s standard splicing method.

G. Welded Connections for Aluminum Pipe: Fabricate pipe guardrails to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer’s standard system of sleeve and socket fittings.

H. Provide weep holes or other means to drain entrapped water in hollow sections of guardrail members that are exposed to exterior or to moisture from condensation or other sources.

I. Fabricate joints that shall be exposed to weather in a watertight manner.

J. Close exposed ends of guardrail members with prefabricated end fittings.

K. Toe Boards: Where indicated on Drawings, provide toe boards at railing around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated on Drawings.

L. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

M. Exposed Mechanical Fastenings: Flush vandal-proof countersunk fasteners unobtrusively located, consistent with design of structure.

N. Fit and shop assemble in sections for delivery.

O. Apply finish to sections for delivery.

P. Make exposed joints flush butt type, hairline joins where mechanically fastened.

Q. Railings: Comply with California and Americans with Disabilities Act Accessibility Guidelines (ADAAG) access requirements and NAAMM AMP 521-01; welded construction; cap exposed ends.

2.5 FINISH

A. Comply with NAAMM AMP 500-06 for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 607.1.

2.6 NON-SHRINK GROUT

A. Non shrink grout shall be Hallemite Mfg. Co.’s “Por-Rok,” Master Builder's "Embeco,” Conrad Sovig's "Metal-Mxs Grout,” Bask's "Ferrolith G Redi-Mixed Grout” or Upco's "Upcon.”

B. Color shall match color of adjacent surface. When 2 colors are present, Contractor shall verify color through submittal with Engineer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Inspect surfaces to receive guardrails and the like and report to Engineer defects which would interfere or affect proper installation.

B. Starting Work implies acceptance of surfaces as satisfactory.

### 3.2 INSTALLATION

A. Layout: Set Work plumb, true, rigid, and neatly trimmed out. Miter corners and angles of exposed moldings and frames unless otherwise noted on Drawings.

B. Fitting: Fit exposed connections accurately together to form tight hairline joints.

C. Install guardrails in accordance with approved shop drawings and Drawings.

### 3.3 ATTACHMENTS

A. Perform cutting, shearing, drilling, punching, threading, tapping, and the like, required for Project Site metalwork or for attachment of adjacent Work. Drill or punch holes; do not use cutting torch. Shearing and punching shall leave true lines and surfaces.

B. Set guardrails to be set in sleeves or cans with molten lead or quick setting non-shrink anchor cement. Unless otherwise noted on Drawings, size sleeves for approximately 1/4-inch clearance all around.

C. Where 2 non-similar metals are in contact with one another, Contractor shall notify Engineer for approved method and material to be used to prevent galvanic corrosion unless otherwise noted on Drawings.

### 3.4 FASTENERS

A. Provide lugs, clips, anchors, and miscellaneous fasteners necessary for the complete assembly and installation.

B. Conceal fasteners where practicable. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Form joints exposed to weather to exclude water.

3.5 OTHER CONNECTORS

A. Make permanent connections in ferrous metal surfaces using welds where at all possible.

B. Do not use bolts or screws where they can be avoided.

3.6 WELDING

A. Standards:

1. AWS D1.2/D1.2M for aluminum.

2. Welding shall be done by operators experienced in the type of Work indicated. Welders shall be certified by City of Los Angeles Department of Building and Safety.

B. Preparation: Remove rust, paint, scale, and other foreign matter. Wire brush flame-cut edges. Clamp members as required and alternate welds, as necessary to prevent warping or misalignment.

C. Exposed Welds: Uniformly make and grind smooth welds normally exposed to view in the finished Work.

D. Faulty and Defective Weld: Chip out and replace welds showing cracks, slag inclusion, lack of fusion, bad undercut, or other defects ascertained by visual or other means of inspection. Replace and reweld at Contractor’s sole cost and expense.

E. Field Welding:

1. Procedure: Comply with AWS code of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding Work.

2. Protection: Protect adjacent surfaces from damage due to weld sparks, spatter, or tramp metal.

3.7 BOLTED, SCREWED, AND RIVETED CONNECTIONS

A. Bolts: Use bolts for field connections only and as detailed on Drawings. Provide washers under heads and nuts bearing on wood. Draw nuts tight and nick threads of permanent connections to prevent loosening. Use beveled washers where bearing is on sloped surfaces.

B. Screws: For permanent connections in ferrous metal, use flat head type, countersunk, with screw slots filled and finished smooth and flush.

C. Rivets: Machine drive tight, rivets, with heads centered, countersunk, and finished flush and smooth.

3.8 WOOD GUARDRAILS

A. Guardrail rails shall be installed in conformance with Ipe wood supplier’s written installation instructions.

3.9 FINISHING

A. Polish surface by finishing with a 120-150 mesh abrasive, following initial grinding with coarser abrasives to achieve a bright finish with a visible "gain" which prevents mirror reflection.

3.10 TOUCH-UP AND PROTECTION

A. Touch-up: Immediately after erection, clean field welds, bolted connections, and abraded areas.

B. Protection: Protect Work from damage or discoloration until acceptance of Work.

3.11 CLEANING

A. Keep Work areas clean, neat, and orderly at all times. Keep paved areas clean during installation.

B. Upon completion of Work under this Section, remove rubbish, waste, and debris from operations off-site or as directed by Engineer. Remove equipment and implements of service and leave the entire Work area in a neat and clean condition as accepted by Engineer.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Stainless steel handrails and related appurtenances including but not limited to:

1. Stairway stainless steel handrails

2. Ramp stainless steel handrails

B. For Work shown on Drawing No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

B. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Stainless Steel Handrails bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel.

B. NAAMM AMP 521-01 - Pipe Railing Systems Manual.

1.5 DESIGN REQUIREMENTS

A. 2010 ADA Standards for Accessible Design requires the top of the gripping surface to be 34 inches minimum and 38 inches maximum vertically above the walking surfaces, stair nosings, and ramp surfaces.

1. Handrails: Handrails with circular cross sections shall be 1-1/4 inches minimum and 2 inches maximum diameter.

2. For ramps and stairs there shall be a 12 inch minimum horizontal extension at the top end beginning directly over the end of the ramp or the first riser nosing.

3. There shall be a 12 inch minimum horizontal extension beginning directly over the bottom of the ramp.

4. At the bottom of the stairs, handrails are to extend at the slope of the stair flight for a horizontal distance at least equal to one tread depth beyond the last stair nosing. At ends, rails shall return to landing surface, wall, or post.

1.6 SUBMITTALS

A. Shop Drawings: Shop drawings shall be submitted with specific dimensions to ensure proper fit. Submit catalog number, options, and voltage. Add special features and requirements necessary to complete specification.

B. Product Data: Manufacturers' current catalog cuts, data sheets, and installation instructions.

C. Drawings shall be to scale and engineered on AutoCAD. No hand sketches shall be allowed.

1.7 QUALITY ASSURANCE

A. Qualifications:

1. Installers shall have experience working and installing handrails and railings on similar projects with regard to size and type of Project within the past 5 years.

2. Welders shall be City of Los Angeles Department of Building and Safety certified.

B. Mock-Ups: Before fabricating and installing handrails, build mock-ups to verify selections made under Design Requirements Article of this Section and to demonstrate aesthetic effects and qualities of materials and execution. Build mock-ups to comply with the following requirements, using materials indicated for the completed Work:

1. Build mock-ups that indicate: Exposed and non-exposed surfaces; straight sections, curves and corners; joints and connections; and other features. The size of each mock-up shall be 1 full-size module (post-to-post) by full height. Install mock-ups at Project Site in a convenient location as selected by Contractor for review and approval of Engineer.

2. Notify Engineer 7 days in advance of dates and times when mock-ups shall be constructed.

3. Obtain Engineer's approval of mock-ups before starting fabrication.

4. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed Work.

5. Demolish and remove mock-ups when directed by Engineer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver fabricated units and components completely identified on shop drawings. Protect surfaces from damage during shipping. Inspect Work for damage upon delivery to Project Site. No materials with defects or scratches on exposed finishes shall be accepted. Contractor shall attend handrail meetings and provide a schedule of Work with shop drawings. At no additional cost to Department, Contractor shall visit the field as often as necessary to obtain the correct measurements.

B. Protection: Protect Work at Project Site from damage and from weather until installed and Work has been accepted.

C. Replacement: Replace damaged materials at no cost to Department.

1.9 PROJECT CONDITIONS

A. Field Measurements: Verify handrail dimensions by field measurements before fabrication and indicate measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Crane Veyor Corp.

B. Fence Corp.

2.2 BASIC MATERIALS AND ACCESSORIES

A. General: Provide metal free from pitting, seam marks, roller marks, stains, discolorations, and other imperfections where exposed to view on finished units.

B. Series: LR6 Series, 1-1/2 inches.

C. Mounting: in accordance with Drawings and approved shop drawings.

D. Material: SS/1.5, stainless steel, and Marine Grade 316 Stainless Steel.

E. Grout: In conformance with CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

2.3 FABRICATION

A. Field Measurement: Make field measurements as required prior to fabrication and installation.

B. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly, coordination and installation. Handrails shall be fabricated prior to delivery to Project Site.

C. Shop fabricate metal and welds to ensure that no non-ferrous oxides and impurities are impregnated into the final stainless steel product. The fabrication process shall be free of any surface impurities to ensure no surface rust shall occur on the finish.

D. Provide surfaces free of file marks, dents, hammer marks, wire edges or any unsightly surface defects.

E. Fabricate items with joints neatly fitted and properly secured.

F. Nonwelded Connections: Fabricate handrails by connecting members with concealed mechanical fasteners and fittings, unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

1. Fabricate splice joints for field connection using an epoxy structural adhesive where this is manufacturer’s standard splicing method.

G. Provide weep holes or another means to drain entrapped water in hollow sections of handrail members that are exposed to exterior or to moisture from condensation or other sources.

H. Fabricate joints that shall be exposed to weather in a watertight manner.

I. Close exposed ends of handrail members with prefabricated end fittings.

J. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of railing and wall is 1/4 inch or less.

K. Exposed Mechanical Fastenings: Flush vandal-proof countersunk fasteners unobtrusively located, consistent with design of structure.

L. Fit and shop assemble in sections for delivery.

M. Apply finish to sections for delivery.

N. Make exposed joints flush butt type, hairline joins where mechanically fastened.

O. Railings: Comply with California and Americans with Disabilities Act Accessibility Guidelines (ADAAG) access requirements and NAAMM AMP 521-01; welded construction; cap exposed ends.

2.4 FINISH

A. Stainless Steel: No. 4 longitudinal satin finish, passivated for maximum rust resistance (standard).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect surfaces to receive handrails and report to Engineer defects which would interfere or affect proper installation.

B. Starting Work implies acceptance of surfaces as satisfactory.

3.2 INSTALLATION

A. Layout: Set Work plumb, true, rigid, and neatly trimmed out. Miter corners and angles of exposed moldings and frames unless otherwise noted.

B. Fitting: Fit exposed connections accurately together to form tight hairline joints.

C. Install handrails in accordance with Drawings and approved shop drawings.

3.3 ATTACHMENTS

A. Perform cutting, shearing, drilling, punching, threading, tapping, and the like, required for Project Site metalwork or for attachment of adjacent Work. Drill or punch holes; do not use cutting torch. Shearing and punching shall leave true lines and surfaces.

B. Where 2 non-similar metals are in contact with one another, Contractor shall notify Engineer for approved method and material to be used to prevent galvanic corrosion, unless otherwise noted on Drawings.

3.4 FASTENERS

A. Provide lugs, clips, anchors, and miscellaneous fasteners necessary for the complete assembly and installation.

B. Conceal fasteners where practicable. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Form joints exposed to weather to exclude water.

3.5 OTHER CONNECTORS

A. Make permanent connections in ferrous metal surfaces using welds where possible.

B. Do not use bolts or screws where they can be avoided.

3.6 WELDING

A. Welding shall be conformance with AWS D1.6/D1.6M for stainless steel.

B. Preparation: Remove rust, paint, scale and other foreign matter. Wire brush flame-cut edges. Clamp members as required and alternate welds, as necessary to prevent warping or misalignment.

C. Exposed Welds: Uniformly make and grind smooth welds normally exposed to view in the finished Work.

D. Faulty and Defective Welding: Chip out and replace welding showing cracks, slag inclusion, lack of fusion, bad undercut or other defects ascertained by visual or other means of inspection. Replace and re-weld at Contractor’s sole cost and expense.

E. Field Welding:

1. Procedure: Comply with AWS code of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding Work.

2. Protection: Protect adjacent surfaces from damage due to weld sparks, spatter, or tramp metal.

## 3.7 BOLTED, SCREWED, AND RIVETED CONNECTIONS

A. Bolts: Use bolts for field connections only and as detailed on Drawings. Provide washers under heads and nuts bearing on wood. Draw nuts tight and nick threads of permanent connections to prevent loosening. Use beveled washers where bearing is on sloped surfaces.

B. Screws: For permanent connections in ferrous metal, use flat head type, countersunk, with screw slots filled and finished smooth and flush.

C. Rivets: Machine drive tight, rivets, with heads centered, countersunk, and finished flush and smooth.

## 3.8 TOUCH-UP AND PROTECTION

A. Touch-up: Immediately after erection, clean field welds, bolted connections and abraded areas.

B. Protection: Protect Work from damage or discoloration until acceptance of Work.

## 3.9 CLEANING

A. Keep Work areas clean, neat, and orderly at all times. Keep paved areas clean during installation.

B. Upon completion of Work under this Section, remove rubbish, waste and debris from operations off-site or as directed by Engineer. Remove equipment and implements of service and leave entire Work area in a neat and clean condition as accepted by Engineer.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Rough carpentry Work. Work includes but is not limited to:

1. Framing
2. Sheathing
3. Nailers
4. Blocking
5. Furring
6. Incidentals involved in rough carpentry

## 1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

B. Section 07 60 00 - Flashing and Sheet Metal

C. Section 09 90 01 - Painting for Exterior Improvements

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires rough carpentry.

## 1.4 REFERENCES

A. ASME B18.2.1 - Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series).

B. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

C. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric).

D. ASTM A575 - Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.

E. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

F. AWPA M1 - Standard for the Purchase of Treated Wood Products.

G. FS FF-S-111 - Screw, Wood.

H. FS FF-W-92 - Washer, Flat (Plain).

1.5 SUBMITTALS

A. Provide shop drawings of framing, blocking, anchoring, and fastening prior to fabrication.

B. Certificates of Grade: Attesting that products meet the grade requirements specified in lieu of grade markings where appearance is important and grade marks shall deface material.

C. Samples:

1. Sheathing: 2 square feet of material to be used and manufacturer's installation instructions.

2. Joist hangers: 2 of each kind.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project Site in undamaged condition. Carefully store materials off the ground to provide proper ventilation, drainage, and protection against dampness. Remove defective and damaged materials and provide new materials.

PART 2 - PRODUCTS

2.1 GRADE STAMPS

A. Framing lumber: Identify framing lumber by the grade stamp of West Coast Lumber Inspection Bureau, or such other grade stamp as approved in advance by Engineer.

B. Plywood: Identify plywood as to species, grade, and glue type by the stamp of American Plywood Association.

C. Other: Identify other materials of this Section by the appropriate stamp of the agency listed in the reference standards, or by such other means as are approved in advance.

2.2 MATERIALS

A. Lumber shall be douglas fir construction and stud grade dressed S4S, unless otherwise shown on Drawings

1. Moisture content: 19 percent maximum at time of permanent closing in of building or structure.

2. Nailers, blocking, rough door bucks, plates, miscellaneous utility grade.

3. Roof Sheathing: Select grade, douglas fir, tongue and groove, as indicated on Drawings.

B. Plywood shall be C-D Exterior Structural I with exterior glue unless otherwise specified or indicated on Drawings.

1. Panel thickness, grade and group number or span rating: As shown on Drawings.

2. Solid-block joints not occurring over supports or use tongue and groove (T & G) plywood.

3. Roof plywood shall not have less than 5 plies.

4. Glue shall meet American Plywood Association (APA) specification for intended use.

5. Plywood backing shall be 1/2-inch thick plywood "B-D" grade.

6. Moisture content: 19 percent maximum.

C. Building paper: ASTM D226/D226M, asphalt-saturated felt, 15 pounds, nonperforated.

D. Redwood shall be select grade unless otherwise specified.

E. Anchorage and fastening materials:

1. Nails, spikes, and staples shall be galvanized for exterior locations, high humidity locations and treated wood; plain finish for other interior locations; stainless steel, aluminum or high quality hot-dipped galvanized for wood siding; ring shank or spiral thread nails for roof and floor sheathing. Size and type to suit applications and as required by Structural Drawings and Code.

2. Wood screws: FS FF-S-111

3. Bolts: ASTM A307

4. Nuts: ASTM A563/A563M

5. Washers: FS FF-W-92

6. Lag Screws or Lag bolts: ASME B18.2.1

7. Bolts, nuts, washers, lags, pins, and screws shall be sized to suit application; galvanized for exterior locations, embedded in or in contact with exterior masonry or concrete walls or slabs, high humidity locations and treated wood; plain finish for other interior locations.

8. Toggle Bolts: Toggle bolt type for anchorage to hollow masonry; expansion shield and lag bolt type for anchorage to solid masonry or concrete; bolts or power activated type for anchorage to steel.

9. Bar or Strap Anchors: ASTM A575 carbon steel bars

10. Masonry or Concrete Anchoring Devices: Self-drilling type, Phillips Red Head or Rawl Sabertooth.

11. Hangers: Steel or iron, sized and profiled to suit application and fit the supported member, of sufficient strength to develop the full strength of the supported member in conformance with City of Los Angeles Building Code. Use Simpson hangers by Simpson Strong Tie Company. Use offset hangers where required. Galvanized finish.

F. Treated lumber shall be C-2 pressure treated per AWPA M1 for lumber above ground.

G. Flashings shall be as specified in FLASHING AND SHEET METAL Section.

H. Other materials, not specifically described but required for a complete and proper installation, shall be as selected by Contractor.

PART 3 - EXECUTION

3.1 FRAMING

A. GENERAL:

1. Rough carpentry Work shall be per approved shop drawings.

2. Produce joints which are tight, true, and well nailed, with members assembled in accordance with Drawings and with pertinent codes and regulations.

3. Construct members of continuous longest possible pieces

4. Framing shall be in conformance with City of Los Angeles Building Code.

B. Selection of lumber pieces:

1. Select individual pieces so that knots and obvious defects shall not interfere with placing bolts or proper nailing, and shall allow the making of proper connections.

2. Cut out and discard defects which shall render a piece unable to serve its intended function.

3. Lumber may be rejected by Engineer whether or not it has been installed, for excessive warp, split, checks, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.

C. Do not shim any framing component.

D. Set horizontal and sloped members with crown up.

E. Joist spacing beneath elastomeric deck coating shall not exceed 16 inches on center.

F. Do not notch, cut, or bore members for pipes, ducts, or conduits, or for other reasons except as shown on Drawings and in locations approved by Engineer.

G. Bearings:

1. Make bearings full unless otherwise indicated on Drawings.

2. Finish bearing surfaces on which structural members are to rest so as to give sure and even support.

3. Where framing members slope, cut or notch the ends as required to give uniform bearing surface.

H. Anchorage or fastenings to metal framing or concrete shall be per approved shop drawings.

I. Wood Grounds:

1. Install continuous wood grounds for attaching casing, base, and other finish wood and millwork.

2. Grounds shall not be less than 1/4 inch wide unless otherwise indicated. Thickness to conform to finish or gypsum board.

J. Furring and Stripping:

1. Install furring and stripping at right angles to framing.

2. Nail to framing at every bearing with box nails and fasten to masonry or concrete or provide other fastening as approved by Engineer.

3.2 BLOCKING

A. Install blocking as required to support items of finish, fixtures, specialty items, and trim and to cut off concealed draft openings, both vertical and horizontal, between ceiling and floor areas.

3.3 BRIDGING

A. Install solid bridging between joists as shown on Drawings and as required by Code. Bridging may be omitted where joists are supported on metal hangers approved for use without blocking.

3.4 ALIGNMENT

A. On framing members to receive a finished surface, align the finish subsurface to vary not more then 1/8 inch from the plane or surfaces or adjacent framing and furring members.

3.5 PLYWOOD SHEATHING

A. Placement of roof sheathing shall be in conformance with City of Los Angeles Building Code.

B. Protection: Protect plywood from moisture by use of waterproof coverings until the plywood has been covered with the next succeeding component of finish.

C. Plywood backing:

1. Plywood backing shall be installed for support of mechanical and electrical equipment on walls.

2. Install backing bolted to structural framing so as to bear weight of equipment. Fasteners shall be counter-sunk.

3.6 WOOD NAILERS

A. Wood nailers shall be treated lumber.

B. Install wood nailers in level position and bolted in place with nuts or heads countersunk and ready to receive sheet metal copings.

3.7 FASTENING

A. Nailing:

1. Use only common wire nails or spikes for the sizes and spacing shown on Nailing Schedule, except where otherwise specifically noted in Contract Documents or required by Building Code.

2. For conditions not covered in Nailing schedule, provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike, provided, however, that 16d nails may be used to connect two pieces of 2 inches (nominal) thickness.

3. Nail without splitting wood; prebore as required; replace split members.

4. Prenail holes for 20d and larger nails.

B. Bolting:

1. Drill holes 1/32 inch to 1/16 inch larger than the bolts being used. Drill straight and true from one side only.

2. Do not bear bolt threads on wood; use washers under head and nut where both bear on wood; use washers under nuts.

3. Bolts: Unfinished bolts conforming to ASTM A307.

C. Screws:

1. For lag screws and wood screws, prebore holes 60 percent to 70 percent of shank diameter as root of threads, enlarging holes to shank diameter for length of shank.

2. Do not drive lag screws and wood screws.

3. Predrill holes for lag screws.

3.8 PRESSURE-TREATED WOOD PRODUCTS

A. Provide pressure-treated wood for:

1. Foundation plates or sills and sleepers on concrete slabs which are in direct contact with earth.

2. Sills which rest on concrete foundations.

3. Wood located nearer than 6 inches to earth.

4. Blocking, furring, and nailing strips installed on exterior concrete or masonry walls.

5. Used in conjunction with gravel stops and roofing.

6. Other locations as required by Building Code.

B. Apply 2 brush coats of same preservative used in original treatment to sawed or cut surfaces of treated lumber.

3.9 BACK PRIMING

A. Back prime with one coat of primer exterior wood trim surfaces that are to be concealed after installation. Comply with the requirements of PAINTING FOR EXTERIOR IMPROVEMENTS Section.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fluid-applied waterproofing membrane system specifically designed for co-spray-application, applicable sealants, drainage, and elastomeric flashings needed to prevent water penetration and methane penetration at locations applied. Fluid-applied waterproofing and/or methane barrier membrane indicated on Drawings, including surface preparation of concrete surfaces, sealing of form ties, cracks, joints, and applications of TREMproof 260.

1.2 RELATED SECTIONS

A. Section 04 22 00 - Concrete Unit Masonry

B. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM C836/C836M - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.

B. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension.

C. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.

D. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.

E. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating.

F. ASTM D4491/D4491M - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

G. ASTM D4716/D4716M - Standard Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.

H. ASTM D4833/D4833M - Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Conduct pre-installation conference at Project Site.

1. Review requirements for waterproofing products and installation, including surface preparation, substrate conditions, project and manufacturer's details, installation procedures, mockups, testing and inspection requirements, protection and repairs, and coordination and sequencing of waterproofing Work with Work of other Sections.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer.

1. Protect substrates from environmental conditions that affect waterproofing performance.

2. Do not apply waterproofing during snow, rain, fog, or mist.

1.7 SCHEDULING

A. Coordinate installation of waterproofing with completion of roofing and other Work requiring interface with waterproofing.

B. Schedule Work so waterproofing applications may be inspected prior to concealment.

C. Ensure waterproofing materials are cured before covering with other materials.

1.8 SUBMITTALS

A. Product Data: For each type of waterproofing product specified, including:

1. Technical data indicating compliance with requirements.

2. Substrate preparation instructions and recommendations.

3. Shop Drawings: Show locations for waterproofing system components. Show details for each type of substrate, joints, corners, and edge conditions, including flashings, counterflashings, penetrations, transitions, and terminations.

B. Qualification Data: For installer, manufacturer, and inspector.

1. Certification of manufacturer's approval of installer.

2. Product Test Reports: Test data for waterproofing products and waterproofing system, by qualified testing agency, indicating proposed waterproofing meets performance requirements, when requested by Engineer.

3. Warranty: Sample of un-executed manufacturer and installer special warranties.

4. Field quality control reports.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: A manufacturer-approved firm with minimum 3 years experience in installation of specified products in successful use on similar projects, employing workers trained by manufacturer, including a full-time on-site supervisor with a minimum of 3 years experience installing similar work, and able to communicate verbally with Contractor, Engineer, and employees.

B. Manufacturer Qualifications: A qualified manufacturer with minimum 5 years experience in manufacture of waterproofing as one of its principal products.

1. Manufacturer's product submitted has been in satisfactory operation on five similar installations for at least 5 years.

2. Qualified independent agency experienced in the installation of the specified waterproofing system, and qualified to perform observation and inspection specified in Field Quality Control Article of this Section to determine Installer’s compliance with the requirements of this Project, acceptable to Engineer, retained by Contractor.

3. Provide waterproofing mockup application within mockups required in other sections, or if not specified, in an area of not less than 150 square feet of surface where directed by Engineer for each type of substrate condition. Include examples of surface preparation, crack and joint treatment, waterproofing application, and flashing, transition, and termination conditions, to set quality standards for execution.

    a. Include intersection of deck waterproofing with adjacent vertical waterproofing and moisture control system.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to job site in manufacturer's unopened containers with labels intact and legible at time of use.

B. Maintain the products in conformance with manufacturer's written instructions with proper precautions to ensure fitness of material when installed.

C. Protect waterproofing materials from freezing prior to application. Store material above 50 degrees Fahrenheit (F).

D. Store TREMDrain drainage, Tremco protection mat off the ground. Provide cover on top and all sides.

1.11 WARRANTY

A. Manufacturer's standard form in which waterproofing manufacturer agrees to furnish waterproofing material to repair or replace those materials installed conforming with manufacturer's written instructions that exhibit material defects or otherwise fail to perform as specified under normal use within warranty period specified.

1. Department shall provide unimpeded access to Project and the waterproofing system for purposes of testing, leak investigation, and repair, and shall reinstall removed cladding and overburden materials upon completion of repair.

2. Manufacturer's obligation for repair or replacement shall be limited to the original installed cost of Work.

3. Warranty Period: 5 years after date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide waterproofing products manufactured by Tremco, Inc., Commercial Sealants and Waterproofing Division, (866) 321-6357; email: techresources@tremcoinc.com; www.tremcosealants.com.

B. Source Limitations: Provide waterproofing system materials and accessory products from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Waterproofing system shall be capable of performing as a continuous watertight installation and as a moisture drainage plane transitioned to adjacent flashings and discharging water to the building exterior. Waterproofing shall accommodate normal substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without resultant moisture deterioration.

B. Provide waterproofing system materials that are compatible with one another and with adjacent materials under conditions of service and application required, as demonstrated by waterproofing manufacturer based on testing and field experience.

2.3 WATERPROOFING MEMBRANE

A. Cold Fluid-Applied Waterproofing: Single component, asphalt emulsion formulated for application to damp and green concrete.

1. Basis of Design Product: Tremco, Inc., TREMproof 260.

2. VOC Content: Less than 72 g/L.

3. Elongation, ASTM D412: 800 percent.

4. Low Temperature Flexibility and Crack Bridging, ASTM C836/C836M: Pass.

5. Peel Adhesion, ASTM D903: Pass.

2.4 ACCESSORY MATERIALS

A. Joint backing: Closed-cell, polyethylene rod as recommended by membrane manufacturer.

1. Joint Sealants: Termination Seals:

2. Single component, high performance, medium-modulus, low-VOC, UV-stable, non-sag polyurethane sealant.

3. Basis of Design Product: Tremco Inc., Dymonic 100.

2.5 WATERPROOFING PROTECTION AND DRAINAGE

A. Glass Fiber Drainage, Protection, and Insulation Board:

1. Basis of Design: Tremco, TREMDrain DPI.

2. Flow Capacity, per unit width, ASTM D4716/D4716M: 21 gallons per minute per ft (gpm/ft).

3. Thickness: 0.75 inch, 1.1875 inch, 2.375 inch.

4. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a nonwoven, spun-bonded polypropylene facing laminated to one side of a studded, non-biodegradable, polystyrene drainage core, with polymeric film attached to back of drainage core.

a. Basis of Design: Tremco, TREMDrain [1000] [1000 PF].

b. Flow Capacity, per unit width, ASTM D4716/D4716M: 18 gpm/ft.

c. Flow Rate, ASTM D4491/D4491M: 165 gpm/ft^2.

d. Apparent Opening Size: No. 70 sieve.

e. Puncture Strength, ASTM D4833/D4833M: 65 pounds.

f. Core Compressive Strength, ASTM D1621: 15,000 pounds per foot squared (lb/ft^2).

g. Thickness: 0.437 inch.

5. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a nonwoven, needle-punched polypropylene facing laminated to one side of a studded, non-biodegradable, polystyrene drainage core.

    a. Basis of Design: Tremco, TREMDrain Total Drain.

    b. Flow Capacity, per unit width, ASTM D4716/D4716M: 18 gpm/ft.

    c. Flow Rate, ASTM D4491/D4491M: 150 gpm/ft^2.

    d. Apparent Opening Size: No. 70 sieve.

    e. Puncture Strength, ASTM D4833/D4833M: 70 pounds.

    f. Core Compressive Strength, ASTM D1621: 9,000 lb/ft^2.

    g. Thickness: 0.437 inch.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Before applying waterproofing materials, examine substrate and conditions to ensure substrates are fully cured, smooth, clean, dry, and free from high spots, depressions, loose and foreign particles and other deterrents to adhesion, and conditions comply with manufacturer's written instructions.

1. Verify concrete and masonry surfaces are free from release agents, curing agents, laitance, and other contaminates. Test for waterproofing adhesion per manufacturer's recommended method. Notify Engineer of unsatisfactory conditions.

2. Verify masonry joints are filled with mortar and struck flush.

3. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INTERFACE WITH OTHER WORK

A. Coordinate sequencing of waterproofing Work with Work of other sections that form portions of building envelope moisture control to ensure that flashings and transition materials can be properly installed and inspected.

B. Coordinate waterproofing Work with Work of other sections installed subsequent to waterproofing to ensure complete inspection of installed waterproofing and sealing of waterproofing penetrations necessitated by subsequent Work.

3.3 PREPARATION

A. Clean, prepare, and treat substrates in conformance with waterproofing manufacturer's written instructions.

1. Mask adjacent finished surfaces.

2. Remove contaminants and film-forming coatings from substrates.

3. Remove projections and excess materials and fill voids with substrate patching material.

4. Prepare and treat joints and cracks in substrate per ASTM D4258 and waterproofing manufacturer's written instructions.

5. Prepare non-moving shrinkage cracks, large cracks, construction joints, expansion joints, projections and protrusions, penetrations, drains, and changes in plane in conformance with waterproofing manufacturer's written instructions and details, using accessory materials specified.

6. Transitions to Adjacent Materials: Apply Tremco Approved Primer to transition cold fluid-applied waterproofing membrane to adjacent components of the building envelope.

3.4 WATERPROOFING INSTALLATION

A. Apply waterproofing material to form a seal with strips and transition strips and to achieve a continuous waterproofing in conformance with waterproofing manufacturer's written instructions. Apply waterproofing material within manufacturer's recommended application temperature ranges.

B. Coordination of Testing:

1. Coordinate application of waterproofing membrane with installation of membrane leak detection system.

2. Do not cover waterproofing until it has been tested and inspected by Department's testing agency.

3. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates and reapply waterproofing components.

## 3.5 PROTECTION INSTALLATION

A. Cover waterproofing with protection course following curing of waterproofing and prior to backfilling or subjecting installation to traffic. Overlap protection course joints.

B. Place and secure drainage panels using methods that do not penetrate waterproofing. Face geotextile away from deck substrate. Lap edges or abut ends of geotextile.

C. Install 1 or more layers of board insulation as required, staggering joints. Fit within 1/2 inch of projections and penetrations.

1. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

## 3.6 FIELD QUALITY CONTROL

A. Engage manufacturer's qualified Inspector full-time during Work to perform tests and inspections, including documenting of waterproofing prior to concealment.

1. Inspector shall measure membrane thickness with a wet film gauge during the application process at least once for every 100 square feet.

2. Provide written report of tests and inspections.

3. Engage a qualified testing agency to perform tests and inspections.

4. Engage a qualified testing agency to inspect substrate conditions, surface preparation, waterproofing application, protection, and drainage components, and to furnish reports to Engineer.

a. Testing includes EFVM inspection prior to concealing deck waterproof membrane.

5. Cooperate with testing agency. Allow access to Work areas and staging. Notify testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.

a. Do not cover Work until testing and inspection is completed and accepted.

6. Forward written inspection reports to Engineer within 10 working days of the inspection and test being performed.

7. Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

## 3.7 CLEANING AND PROTECTING

A. Clean spills, stains, and overspray resulting from application utilizing cleaning agents recommended by manufacturers of affected construction. Remove masking materials.

B. Protect waterproofing from damage from subsequent Work. Protect waterproofing materials from exposure to UV light for period in excess of that acceptable to waterproofing manufacturer; replace overexposed materials and retest.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Liquid-applied, non-sacrificial surface sealer at exposed exterior concrete and masonry surfaces.

1.2 RELATED SECTIONS

A. Section 04 22 00 - Concrete Unit Masonry

B. Section 09 96 23 - Graffiti-Resistant Coatings

C. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires water repellents.

1.4 SUBMITTALS

A. Product Data: Manufacturer's technical data, application instructions, material Safety Data Sheets (SDS), and published literature stating recommended coverage rates. Include:

1. Instructions and recommendations for cleaning and preparation of surfaces.

2. Coating application techniques.

3. Equipment to be used.

4. Protection of adjacent materials.

5. Recommendations for products and techniques for removing various types of graffiti.

6. Cleaning methods for overspray.

7. Special procedures.

B. Samples:

1. 18-inch-square sample of each substrate to receive water repellent, with water repellent applied to half of sample.

2. Apply coating on mock-up panel and sample panel for review and approval both for aesthetics and effectiveness, accompanied with a letter stating the actual application rates required to meet warranty requirements.

C. Quality Control:

1. City of Los Angeles Research Report with RR number; RR 25079-T.

2. Statement of applicator qualifications.

3. Post-application inspection report by manufacturer's representative, verifying Work has been applied in conformance with Specifications and manufacturer's written instructions.

D. Closeout:

1. Extra stock as specified.

2. Extended warranty as specified.

1.5 QUALITY ASSURANCE

A. Comply with South Coast Air Quality Management District (SCAQMD) requirements including but not limited to volatile organic compound (VOC) regulations.

B. Coatings shall be approved by City of Los Angeles City Department of Building and Safety.

C. Mock-up: Provide minimum 4 feet by 4 feet sample panel for each type of substrate to which water repellent coating shall be applied.

1. Apply proposed coating over half of substrate.

2. 5 days after application, in presence of Engineer, flood mock-up with water or use a suitable water-absorption device, to verify that surface shall repel moisture effectively.

3. Test surface with common waterborne graffiti media, to verify graffiti-repellent qualities and cleanability.

4. Accepted sample panel shall set standard for finish and quality of Work. Remove sample panel when directed by Engineer.

1.6 WARRANTY

A. Warrant that surfaces treated with water repellent shall be free of defects in materials and workmanship, and that treated surfaces shall remain water repellent. No warranty for graffiti repellency is intended or required.

1. Upon expiration of warranty period, sufficient water repellent shall remain on treated material to reduce water absorption to less than 50 percent of the water absorbed by an untreated sample of the same material in a 24-hour water-absorption test.

2. Where terms of manufacturer's guarantee require, provide a full-time Project Site inspector to supervise application.

B. Locate and recoat defective Work during warranty period at no cost to Department.

C. Warranty Period: 10 years.

1.7 EXTRA MATERIALS

A. Provide five 1-gallon cans of graffiti removing compound and 1 hand operated spray applicator to Department for maintenance purposes.

PART 2 - PRODUCTS

2.1 DESIGN AND PERFORMANCE REQUIREMENTS

A. Water repellent shall not darken, stain, or discolor substrate.

B. Water repellent shall not change reflectivity of substrate by having a sheen or a gloss when dry.

C. Water repellent shall be “breathable” and shall permit water vapor to escape from treated concrete, precast concrete, and masonry.

D. Water repellent shall reduce water absorption of treated substrate to less than 25 percent of water absorbed by an untreated sample of the same material in a 24-hour water-absorption test.

E. Surfaces treated with water repellent shall resist dark staining and degradation caused by fungal growth, mold, and mildew.

F. Surfaces treated with water repellent shall resist most graffiti media, and shall permit easy cleaning of most graffiti media.

2.2 MATERIALS

A. Sure Klean Weather Seal Blok-Guard & Graffiti Control II as manufactured by ProSoCo, Lawrence, Kansas.

1. Coating shall be water-based and VOC-compliant.

2. Coating shall be clear, non-yellowing, weather resistant, and ultra-violet resistant.

3. Coating shall meet requirements of City of Los Angeles RR 25079-T.

B. Primer (If Required): As recommended by coating manufacturer.

C. Graffiti-Removing Compound: As recommended by manufacturer of graffiti/ water repellent; Fast-Acting Stripper by ProSoCo.

D. Application Equipment: Low-pressure airless sprayer and hoses as recommended by manufacturer. Pump shall not atomize material.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surfaces to receive coatings shall be dry, free of dust, dirt, rust, alkali, efflorescence, oil, grease, loose and peeling paint, scale, and other foreign material.

B. Clean and prepare surfaces to receive coatings in conformance with manufacturer's written instructions.

1. Verify calks, concrete curing compounds, and sealers are fully cured and compatible with the coating.

2. Verify that painted surfaces are fully cured and compatible with coating.

C. Protect adjacent surfaces against spatter. Take special precautions to cover and protect finished Work.

3.2 APPLICATION

A. Prepare and mix coatings in conformance with manufacturer's written instructions.

B. Apply coatings when temperature is above 50 degrees Fahrenheit (F) but below 100 degrees F. Do not apply coating if rain is imminent within 24 hours.

C. Apply coatings using methods and equipment in conformance with manufacturer's written instructions and SCAQMD requirements.

D. Allow curing time between coats in conformance with manufacturer's written instructions.

E. Apply over entire exposed exterior concrete masonry surfaces at the buildings, unless otherwise specified or indicated on Drawings.

1. Do not coat cast glass wall assembly.

2. Do not coat glazed concrete unit masonry (Astro-Glaze).

3. Do not apply graffiti-resistant coating over the water repellent coating. Since the specified water repellent coating also has graffiti-resistant properties, no graffiti-resistant coatings are required to be applied over the water repellent coating.

F. Refer to GRAFFITI-RESISTANT COATINGS Section for surfaces that need graffiti resistant coatings.

3.3 CLEANING

A. Clean spillage and overspray from adjacent surfaces in conformance with coating manufacturer's written instructions.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Coated fiberglass-mat gypsum sheathing board system with integral weather-resistant barrier (WRB) and air barrier (AB) features, and accessory materials required for covering sheathing joints, fasteners, penetrations, rough openings, and material transitions, for use under exterior wall claddings.

B. Fluid-applied membrane air barrier.

## 1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

B. Section 06 10 00 - Rough Carpentry

C. Section 07 92 00 - Joint Sealants

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. AAMA 714 - Specification for Liquid Applied Flashing Used to Create a Water-Resistive Seal Around Exterior Wall Openings in Buildings.

B. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.

C. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.

D. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials.

E. ASTM E2357 - Standard Test Method for Determining Air Leakage Rate of Air Barrier Assemblies.

F. ICC-ES AC212 - Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing.

1.5 DEFINITIONS

A. Air Barrier (AB): Air tight barrier made of material that is relatively air impermeable but moisture vapor permeable, with sealed joints and penetrations, and with terminations sealed to adjacent surfaces.

B. Weather-Resistant Barrier (WRB): Water-shedding barrier made of material that is moisture-resistant, installed to shed water, with sealed joints and penetrations, and with terminations sealed to adjacent surfaces.

C. Rough Openings: Openings in the wall to accommodate windows and doors.

D. Material Transitions: Areas where WRB/ AB coated fiberglass-mat gypsum sheathing connects to beams, columns, slabs, parapets, foundation walls, roofing systems, and at the interface of dissimilar materials.

1.6 SUBMITTALS

A. Product Data and Installation Instructions: Submit manufacturer’s product data including sheathing and accessory material types, composition, descriptions and properties, installation instructions, and substrate preparation recommendations.

B. Shop Drawings: Submit shop drawings indicating locations and extent of WRB/AB system, including details of typical conditions, special joint conditions, intersections with other building envelope systems and materials; counter flashings and details showing bridging of envelope at substrate changes, details of sealing penetrations, and detailed flashing around windows and doors

C. Test Reports: Submit test reports indicating compliance with specified performance characteristics and requirements

D. Sample Warranty: Submit a sample warranty identifying the terms and conditions of the warranty as herein specified.

E. Evaluation Reports: Accredited laboratory testing for materials.

1.7 QUALITY ASSURANCE

A. Mock-Up:

1. Install WRB/AB sheathing with sealed joints and penetrations in mock-up.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store WRB/AB coated fiberglass mat gypsum sheathing under cover and keep dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack sheathing flat and supported on risers on a flat platform to prevent sagging.

B. Protect fluid applied material, primers and accessory materials from damage, weather, excessive temperatures, and construction traffic.

C. Store fluid applied material and primers at temperatures of 40 degrees Fahrenheit (F) or above.

D. Apply fluid applied material to clean surfaces free of contaminants. Chemical residues, surface coatings, or films may adversely affect adhesion. Pressure-treated wood and other contaminated surfaces should be cleaned with a solvent wipe before application.

1.9 FIELD CONDITIONS

A. Application standards where applicable are in conformance with Gypsum Association Publication GA-253 for gypsum sheathing and ASTM C1280.

B. Do not install sheathing that is moisture damaged. Indications that panels are moisture damaged include, but not limited to, discoloration, sagging, or irregular shape.

C. Allow installed sheathing to be dry to the touch before sealing joints, penetrations, rough openings, and material transitions.

D. Do not attempt to seal joints, corners, penetrations, rough openings, and material transitions when installed sheathing surface is frozen or has frost on the surface.

E. Do not apply sealing materials to sheathing when air or surface temperature is below 40 degrees F for fluid applied materials.

F. Sequencing: Do not install air barrier material before the roof assembly has been sufficiently installed to prevent a buildup of water in the interior of the building.

G. Compatibility: Do not allow air barrier materials to come in contact with chemically incompatible materials.

H. Do not expose air barrier materials to sunlight longer than as recommended by the material manufacturer.

1.10 WARRANTY

A. Provide manufacturer’s exposure warranty that offers 12 months of coverage against in-place exposure damage (delamination, deterioration) beginning with the date of installation of the product.

B. Provide manufacturer's standard warranty for sheathing to be free of manufacturing defects that make it unsuitable for its intended use. Warranty period shall be 10 years from the date of purchase of the product.

C. Any eligible DensElement Barrier System when properly installed in such structure as part of an architecturally specified EIFS, shall effectively drain incidental moisture between DensElement Sheathing and insulation board of the architecturally specified EIFS for a period of 12 years from the date of installation of the system in such structure provided EIFS manufacturer’s moisture drainage details and accessories are followed and used.

D. Material Warranty: Provide material manufacturer’s standard product warranty, for a minimum 3 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WEATHER BARRIER ASSEMBLIES

A. Acceptable products: DensElement Barrier System as manufactured by Georgia-Pacific Gypsum, LLC.

1. Sheathing: DensElement Sheathing.

2. Fluid-applied flashing materials: Fluid-applied flashing as approved by Georgia-Pacific Gypsum, LLC.

3. Primers, backer rods, and accessory materials: As approved by Georgia-Pacific Gypsum, LLC.

B. System Description: Weather-Resistant Barrier and Air Barrier assembly installed at exterior stud walls under exterior cladding, consisting of the following components as herein specified:

1. Sheathing: WRB/AB coated fiberglass mat gypsum sheathing.

2. Fluid-applied flashing to seal sheathing joints, inside and outside corners, penetrations, rough openings, and material transitions.

3. Primer to seal raw gypsum edges before applying fluid applied flashing.

4. Backer rods and accessory materials.

2.2 WEATHER-RESISTANT BARRIER (WRB) AND AIR BARRIER (AB) GYPSUM SHEATHING

A. Description: Coated fiberglass mat gypsum sheathing with integral WRB and AB complying with applicable requirements of ICC-ES AC212, ASTM E2178, ASTM E2357.

B. Vapor Permeability: When tested as system in conformance with ASTM E96/E96M (water method) WRB and AB system has a minimum vapor permeance of 20 perms with sealed joints and fasteners.

C. WRB and Air Barrier Gypsum Sheathing has a moisture absorption rate of less than 6 percent.

D. Air Barrier performance requirements:

1. Air permeance of sheathing: Sheathing with an air permeability not greater than 0.001 cubic feet per minute per square foot (cfm/ft^2) when tested in conformance with ASTM E2178.

2. Air permeance of assembly: Assembly of sheathing and sealing components with an average air leakage not greater than 0.04 cfm/ft^2 when tested in conformance with ASTM E2357.

2.3 FLUID-APPLIED FLASHING AND ACCESSORY MATERIALS FOR JOINTS, INSIDE AND OUTSIDE CORNERS, FASTENERS, ROUGH OPENINGS, AND MATERIAL TRANSITIONS

A. Substrate Requirements:

1. Sheathing joint and transition gaps to receive fluid-applied flashing shall be less than 1/4 inches.

2. Gaps that are more than 1/8 inches and less than 1/4 inches shall be filled with a backer rod to support the fluid applied flashing at the transition joint.

3. For gaps larger than 1/4 inches use fluid-applied flashing as approved by Georgia-Pacific Gypsum, LLC.

B. Fluid applied flashing for panel joints, inside and outside corners, and penetrations

1. Description: Water based fluid applied flashing.

2. Properties:

a. Acceptable substrate: Georgia-Pacific Gypsum LLC DensElement Sheathing.

b. Adhesion to fiberglass mat faced sheathing: No delamination from face of sheathing.

c. Applied wet film thickness: 16 mils.

d. Air permeance: meets 0.004 cubic feet per minute per square foot, maximum, when tested in conformance with ASTM E2178.

e. Water vapor permeance: Greater than 10 perms, minimum, when tested in conformance with ASTM E96/E96M.

f. Ultraviolet and weathering resistance: Approved for 12 months weather exposure.

g. Comply with applicable requirements of AAMA 714.

3. Primer: Provide primer to seal the cut edges of gypsum sheathing.

C. Fluid applied flashing for sealing fasteners:

1. Description: Water based fluid applied flashing.

2. Properties:

a. Acceptable substrate: Georgia-Pacific Gypsum LLC DensElement Sheathing.

b. Adhesion to fiberglass mat faced sheathing: No delamination from face of sheathing.

c. Applied wet film thickness: 16 mils.

d. Air permeance: Meets 0.004 cubic feet per minute per square foot, maximum, when tested in conformance with ASTM E2178.

e. Water vapor permeance: Greater than 10 perms, minimum, when tested in conformance with ASTM E96/E96M.

f. Ultraviolet and weathering resistance: Approved for 12 months weather exposure.

g. Comply with applicable requirements of AAMA 714.

D. Fluid applied flashing for sealing rough openings

1. Fluid applied flashing: Water based fluid applied flashing.

2. Primer: Water based primer to seal the cut edges of gypsum exposed in rough openings for windows and doors. Apply primer to raw gypsum board edges by brushing on a thin, uniform coat.

3. Properties:

a. Acceptable substrate: Georgia-Pacific Gypsum LLC DensElement Sheathing.

b. Flashing adhesion to fiberglass mat faced sheathing: No delamination from face of sheathing.

c. Applied wet film thickness: 16 mils.

d. Flashing air permeance: meets 0.004 cubic feet per minute per square foot, maximum, when tested in conformance with ASTM E2178.

e. Flashing water vapor permeance: Greater than 10 perms, minimum, when tested in conformance with ASTM E96/E96M.

f. Ultraviolet and weathering resistance: Approved for 12 months weather exposure.

g. Flashing comply with applicable requirements of AAMA 714.

E. Material transitions using fluid applied flashing:

1. Refer to substrate requirements for treatment of gaps as specified herein. Gaps from 1/8 inches to 1/4 inches shall be filled with a backer rod prior to applying fluid applied flashing. Gaps greater than 1/4 inches shall be sealed with fluid-applied flashing as approved by Georgia-Pacific Gypsum, LLC.

2. Fluid applied flashing for material transitions: Water based fluid applied flashing.

3. Properties:

    a. Acceptable substrate: Georgia-Pacific Gypsum LLC DensElement Sheathing.

    b. Adhesion to fiberglass mat faced sheathing: No delamination from face of sheathing.

    c. Applied wet film thickness: 16 mils

    d. Air permeance: 0.004 cubic feet per minute per square foot, maximum, when tested in conformance with ASTM E2178.

    e. Water vapor permeance: Greater than 10 perms, minimum, when tested in conformance with ASTM E96/E96M.

    f. Ultraviolet and weathering resistance: Approved for 12 months weather exposure.

        1) Comply with applicable requirements of AAMA 714.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove projections, protruding fasteners, loose, or damaged sheathing material at edges of panel that might interfere with proper installation to seal joints, corners, fasteners, penetrations, openings, or material transitions.

B. Wipe down the sheathing surface to receive sealing materials with a clean cloth.

3.2 INSTALLATION OF WEATHER-RESISTANT BARRIER (WRB) AND AIR BARRIER (AB) SHEATHING

A. WRB/AB Coated fiberglass mat sheathing:

1. Install and fasten DensElement Sheathing according to manufacturer’s written installation instructions.

2. Fastener and penetration treatment: Treat countersunk fasteners (penetrating through the fiberglass mat) with specified fluid applied flashing used for sealing joints.

3.3 FLUID APPLIED FLASHING FOR SEALING SHEATHING JOINTS, INSIDE AND OUTSIDE CORNERS, FASTENERS, ROUGH OPENINGS, AND MATERIAL TRANSITIONS

A. Sealing DensElement Sheathing Joints using specified Fluid Applied Flashing:

1. Apply fluid applied flashing over the joint in a zig-zag or ribbon pattern dispensed from a tube type container. Cover a minimum of 1 inch on both sides of the joint.

2. With a 4 or 6 inch straight edge knife or trowel, spread evenly over the sheathing joint.

3. Apply at a rate to achieve a wet mil thickness of 16 mils over the entire joint area.

B. Sealing DensElement Sheathing Vertical Corners using specified Fluid Applied Flashing:

1. Prime exposed gypsum edges with specified primer.

2. Apply fluid applied flashing over the inside and/or outside corner in a zig-zag or ribbon pattern dispensed from either a tube type container. Cover a minimum of 2 inches on both sides of the corner.

3. With a 4 or 6 inch straight edge knife or trowel, spread evenly over the sheathing corner.

4. Apply at a rate to achieve a wet mil thickness of 16 mils over the corner area.

C. Sealing DensElement Sheathing Fasteners using specified Fluid Applied Flashing: Apply the fluid applied flashing material to fasteners, and wipe down with a straight edge tool; provide a minimum 16 mil thick coating over the fastener.

D. Sealing DensElement Sheathing Rough Openings using specified Fluid Applied Flashing

1. Prime exposed gypsum edges with specified primer

2. Apply a bead of fluid applied flashing into the entire width of the inside corners of the opening dispensed from a tube type container.

3. Apply fluid applied flashing onto:

    a. Sills of openings

    b. Jambs of openings

    c. Headers of openings

4. Apply fluid applied flashing 2 inches over the entire width of the opening sill, jamb, and header on exterior set windows and doors. Apply fluid applied flashing over the entire width of the opening sill, jamb, and header on interior set windows and doors. Apply in a zig-zag or ribbon pattern dispensed from a tube type container.

5. Apply fluid applied flashing over the sheathing adjacent to the opening sill, jamb, and header in a zig-zag or ribbon pattern dispensed from a tube type container. Cover a minimum of 2 inches of the sheathing surface adjacent to the opening.

6. With a 4 or 6 inch straight edge knife or trowel, spread fluid applied flashing over entire width of the sill, jamb, header, and sheathing surface adjacent to the opening.

7. Apply at a rate to achieve a wet mil thickness of 16 mils over the opening area.

E. Sealing DensElement sheathing material transitions using specified Fluid Applied Flashing:

1. Sheathing joint and transition gaps to receive fluid-applied flashing shall be less than 1/4 inches.

2. For gaps larger than 1/4 inches use shall be sealed with fluid-applied flashing as approved by Georgia-Pacific Gypsum, LLC.

3. Gaps that are more than 1/8 inch and less than 1/4 inches shall be filled with a backer rod to support the fluid applied flashing at the transition joint.

4. If necessary, prime the adjacent material with primer per the material manufacturer’s written instructions.

5. Apply fluid applied flashing over the sheathing and adjacent material in a zig-zag or ribbon pattern dispensed from a tube type container. Ensure the flashing is a minimum of 2 inches on each substrate material surface.

6. With a 4 or 6 inch straight edge knife or trowel, spread fluid applied flashing over material transition joint.

7. Apply at a rate to achieve a wet mil thickness of 16 mils.

3.4 SEALING EXTERIOR WALL PENETRATIONS

A. Exterior wall penetration shall be sealed to prevent air and water infiltration. Penetrations may be sealed with fluid applied flashing.

B. For round or square pipe/duct penetrations use specified fluid applied flashing, refer to DensElement Barrier System Technical Guide for instructions for proper sealing.

3.5 FIELD QUALITY CONTROL

A. Do not cover installed WRB/AB assembly until required inspections have been completed and installation has been accepted.

B. Where applicable, allow for inspection by Engineer and air barrier testing and reporting.

3.6 PROTECTION

A. Protect WRB/AB assembly from damage during installation and during the construction period.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Prefinished, prefabricated structural standing seam roof system with continuous interlocking field-formed seams.

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

B. Section 06 10 00 - Rough Carpentry

C. Section 07 60 00 - Flashing and Sheet Metal

D. Section 07 92 00 - Joint Sealants

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires metal roof panels.

1.4 REFERENCES

A. ASCE 7-10 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

B. ASTM C1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.

C. ASTM D523 - Standard Test Method for Specular Gloss.

D. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.

E. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.

F. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

G. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

H. ASTM E1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.

I. ASTM E1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems.

J. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

K. CRRC-1 - CRRC-1 Roof Product Rating Program Manual.

L. ISO/IEC 17025 - General Requirements for the Competence of Testing and Calibration Laboratories.

M. SMACNA (ASMM) - Architectural Sheet Metal Manual.

N. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies.

O. UL 790 - Standard for Standard Test Methods for Fire Tests of Roof Coverings.

1.5 SUBMITTALS

A. Design and Test Reports: Provide the following certified test reports from an independent testing laboratory:

1. Provide copies of the panel manufacturer’s current evaluation reports. The report must include pertinent information regarding weather resistance, fire classification, structural capabilities, wind uplift resistance, impact resistance, live loads, underlayment, load tables, and attachment details:

2. Mill production reports certifying that the steel thicknesses are within allowable tolerances of the nominal or minimum thickness or gauge specified.

3. Design Loads: Submit copy of manufacturer’s minimum design load calculations according to ASCE 7-10, Method 2 for Components and Cladding. In no case shall the design loads be taken to be less than those detailed in Design and Performance Criteria article.

4. Shop Drawings:

    a. Indicate thickness and dimensions of parts, fastenings and anchoring methods, details and locations of joints, transitions and other provisions necessary for thermal expansion and contraction.

    b. Indicate locations of field and factory-applied sealant.

5. Samples:

    a. Submit two samples, 12 inches long by full panel width, showing proposed metal thickness and seam profile.

    b. Submit standard color samples of metal for Engineer's selection.

B. Manufacturer Qualifications: Add manufacturer’s signed letter supporting both financial capability and at least 5 projects of comparable size with Engineer and Contractor contact information.

C. Installer Qualifications: Submit list of five completed projects, with names and contact information for Engineers and Contractors. Submit signed letter from Manufacturer demonstrating completion of manufacturer’s certified installation class.

1. Test Reports: Indicate compliance of products with project requirements.

2. LEED Submittals:

    a. LEED Credit SS 7.2 – Heat Island Effect – Roof: Product data indicating Solar Reflectance Index (SRI) of roof panels.

    b. LEED Credit MR 4 – Recycled Content: Product data indicating percentage by weight of post-consumer and post-industrial recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.

D. Warranty Documentation: Provide an un-executed copy of the warranty specified for this Project, identifying terms and conditions required of the manufacturer, installing Contractor, and Department.

E. Any material submitted as equal to the specified material must be accompanied by a report reviewed by a Professional Engineer licensed in California. This report shall show that the submitted equal product(s) meets the Design and Performance criteria in this Specification. Substitution requests submitted without licensed engineer approval shall be rejected for non-conformance. The owner’s decision regarding substitutions shall be considered final. Unauthorized substitutions shall be rejected.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Ten years' experience, minimum, in the factory fabrication of metal panels. (Ten years’ experience, minimum, in the field fabrication of metal panels)

B. Installer Qualifications:

1. Three years' experience, minimum, in the successful application of metal roof or wall panels.

a. Five satisfactory projects with metal panel Work of similar product(s), scope and complexity to Work of this Project.

b. Installer must be approved by manufacturer, in writing, prior to bid. Approval document must be included with Project bid.

C. Testing Agency Qualifications: Agency compliant with ISO/IEC 17025.

D. Source Limitations: Obtain components of roof system (including underlayment) from a single manufacturer, including roll goods materials if required. Secondary products that are required shall be recommended and approved in writing by the roofing system manufacturer.

E. Engage the manufacturer’s field representative to conduct required periodic inspections of Work in progress as described herein and shall furnish written documentation of such inspections. inspections required and a final inspection before the close of Project.

1.7 PRE-INSTALLATION CONFERENCE

A. Convene a pre-roofing conference approximately 2 weeks before scheduled commencement of roofing system installation and associated Work.

B. Require attendance of installer of each component of associated Work, installers of deck or substrate construction to receive roofing Work, installers of rooftop units and other Work in and around roofing which must precede or follow roofing Work (including mechanical Work if any), Engineer, roofing system manufacturer's representative, and other representatives directly concerned with performance of Work, including (where applicable) Department's insurers, testing agencies and governing authorities.

1. Objectives of conference to include:

a. Review foreseeable methods and procedures related to roofing Work, including set up and mobilization areas for stored material and Work area.

b. Tour representative areas of roofing substrates (decks); inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory Work performed by others.

c. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.

d. Review roofing system requirements (Drawings, Specifications, and other Contract Documents).

e. Review required submittals both completed and yet to be completed.

f. Review and finalize construction schedule related to roofing Work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.

g. Review required inspection, testing, certifying and material usage accounting procedures.

h. Review weather and forecasted weather conditions and procedures for coping with un favorable conditions, including possibility of temporary roofing

i. Record discussion of conference including decisions and agreements (or disagreements) reached. Furnish a copy of records to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements shall be resolved and set date for reconvening conference.

j. Review notification procedures for inclement weather or non-working days

C. Engineer shall designate one of the conference participants to record the proceedings and promptly distribute them to the participants for record.

D. Intent of the conference is to resolve issues affecting the installation and performance of roofing Work. Do not proceed with roofing Work until such issues are resolved to the satisfaction of Engineer of Record. This shall not be construed as interference with the progress of Work on the part of Engineer of Record.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:

1. Keep panels and accessory items dry.

a. Protect against damage and discoloration.

2. Handle panels with non-marring slings.

3. Support panels to prevent permanent deformation.

4. Store panels above ground, with one end elevated for drainage.

5. Protect panels against standing water and condensation between adjacent surfaces.

a. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and keep sheets separate for air-drying.

b. Painted panels may (depending on material or coating) be shipped with protective plastic sheeting or a strippable film coating between panels. Remove strippable film coating prior to installation. Do not allow strippable coating to remain on panels in extreme heat, cold, or direct sunlight or other UV source.

c. Do not allow panels to contact treated lumber.

d. Adequately cover/protect metal panels and flashing with tarpaulins, scrim sheeting, or similar protection during transit to prevent dirt and debris from coming in contact with the exposed finished surfaces of finished goods.

e. Protect packaged panels, flashing, and accessories from UV sources, dirt or sand, and precipitation until they are used.

6. Installer's responsibilities:

a. Stack pre-finished materials to prevent twisting, bending, abrasion and denting and elevate one end to facilitate moisture run-off.

b. Unload panels with equipment that shall adequately support the panels to prevent damage. Verify equipment is sufficient to lift the weight of panels while still in crating. Certified riggers may be required.

c. Protect moisture-sensitive and water-based materials from the weather.

d. Inspect materials upon delivery. Reject and remove physically damaged or marred material from Project Site.

1.9 FIELD CONDITIONS

A. Determine that Work of other trades shall not hamper or conflict with necessary fabrication and storage and protection requirements for roofing system.

1. Protection: Ascertain that Work of other trades penetrating the roof/siding substrate is made watertight and approved prior to installation of new metal roofing/siding panel system.

1.10 DESIGN AND PERFORMANCE CRITERIA

A. Thermal Expansion and Contraction:

1. The completed metal roofing system and flashing shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.

2. The design temperature differential shall be not less than 120 degrees Fahrenheit (F) and based on historical high and low temperatures in the area of the installation.

3. Interface between panel and clip shall provide for adequate thermal movement in each direction along the longitudinal direction.

4. Location of metal roofing rigid connector shall be at roof ridge unless otherwise approved by Engineer and TMP.

1.11 WARRANTY

A. Manufacturer's Finish Warranty: Manufacturer’s standard 30 year performance warranty, stating the following:

1. Architectural fluorocarbon finish.

B. Installer's Warranty: Warrant panels, flashings, sealants, fasteners, and accessories against defective materials and/or workmanship, covering repairs required to maintain roof panels watertight and weatherproof with normal usage for 2 years following Project Substantial Completion date.

1. Furnish written warranty, signed by installer.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Products: Provide the following:

1. Taylor Metal Products (MS-200)

a. ICC Evaluation Report-ESR-5046- TMP Metal Roofing Panels (October 2022) Or--UL Evaluation Report- UL ER25913-01 (May, 31 2022).

2.2 PANELS

A. Products: MS-200

B. Panels: Basis of Design - 2 inch MS-200 Mechanical Seam Metal Roof Panel

1. Material: Aluminum

a. 040 minimum thickness of aluminum.

2. Panel Width and Pattern: 16 inch with striation pattern

3. Panel Seam Height: 2 inch.

4. Panel Finish:

    a. Polyvinylidene Fluoride, full 70 percent Kynar 500 consisting of a baked-on nominal 0.25 mil corrosion resistant primer and a baked-on 0.70-0.80 mil finish coat with a specular gloss of 25 to 35 when tested in conformance with ASTM D523 at 60 degrees.

    b. Marine Guard (Marine or Corrosive environments) consisting of a high-build, corrosion resistant primer, finish coat, and clear top coat.

    c. Color: Glacier White PVDF.

    d. Panel Color: Glacier White

5. Seam Sealant: Factory applied, high-grade non-skinning sealant within the confines of panel and concealed clip's female leg, designed to seal against adjacent male panel leg.

6. ICC Evaluation Report- ESR-5046- TMP Metal Roofing Panels (October, 2022)

7. UL Evaluation Report- UL ER25913-01 (May 31, 2022)

## 2.3 FRAMING AND SUBSTRATES

A. Roofing Underlayment: Owens Corning Titanium PU30 HT Ice and Water Underlayment Shield self-adhering.

1. Roofing Felt.

2. Self-Adhering Sheet Underlayment.

## 2.4 CLIPS AND FASTENERS

A. Clips: Provide clip designed to allow panels to thermally expand and Contract. Clip shall incorporate a self-centering feature to allow of movement in both directions along panel length. Clip type shall be selected to meet positive and negative pressures as specified.

B. Fasteners: As recommended by manufacturer for performance indicated (size, length, clip fasteners, trim fasteners). Weather coated per Project environment, conditions and substrate.

2.5 INSULATION

A. Rigid Insulation:

1. Thermal Spacer Blocks: As recommended by roofing manufacturer.

2.6 ACCESSORIES

A. Trims and Flashings: Material, metal thickness, and finish to match panels. Profiles indicated in drawings.

B. Panel Penetration Flashings: As recommended by panel manufacturer; designed to provide sufficient movement to prevent creation of points of fixity at penetrations.

C. Sealant for Field Application: non skinning butyl.

2.7 FABRICATION

A. Fabrication:

1. Unless otherwise shown on Drawings or specified in this Section, fabricate panels in continuous lengths and fabricate flashings and accessories in longest practical lengths.

2. Panel materials shall be factory correctly leveled.

B. Panels:

1. Provide panels in full length from ridge to eave up to 150 feet Traverse seams are not allowed.

2. Roof panels shall have flush horizontal and vertical surfaces to facilitate sealing at terminations. Panel configurations which create voids and requiring supplemental closure devices shall not be considered acceptable (foam closures).

3. Engineer panels to use concealed anchors that permit expansion and contraction away from the point of fixity (“PIN” point).

C. Seams:

1. Panel seams shall interlock entire length of seam.

2. Design standing seam to lock up and resist joint disengagement during design wind uplift conditions as calculated according to local building codes.

3. Provide pre-installed sealant within confines of panel's female leg to aid in resistance of leaks and provide panel-to-panel seal while allowing expansion and contraction movement.

4. Seams shall be continuously locked or crimped together by mechanical means during installation. Seaming tools shall be sourced from manufacturer's recommended vendor.

D. Fabrication Tolerances:

1. Flat metal surfaces shall display waviness commonly referred to as "oil canning". This is caused by steel mill tolerances and is a characteristic, not a defect, of panels manufactured from light gauge metal. Panel materials are factory corrective leveled to minimize the occurrence of "oil canning". As such, "oil canning" shall not be accepted as cause for rejection.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: With installer present.

1. Examine conditions and substrates on which metal panels are to be installed. Structural support or substrate shall be flat and plumb to avoid panel stresses and distortion.

2. Prior to starting Work, correct defects.

B. Field Measurements:

1. Coordinate field measurements and fabrication schedule with construction progress.

2. Field measure prior to fabrication. Show recorded dimensions on shop drawings, including locations of shop-fabricated openings.

3. If field measurements differ from drawing dimensions, notify Engineer prior to fabrication.

C. Tolerances: Deviations from flat plane shall not exceed the following.

1. 1/4 inch in 20 feet.

2. 1/2 inch across building elevation.

3. 1/8 inch in 5 feet.

3.2 PREPARATION

A. Install according to approved shop drawings and metal panel manufacturer's written instructions.

3.3 INSTALLATION

A. Panels and Trim: Comply with manufacturer's instructions for assembly, installation and erection for weather tight installation.

1. Install according to approved shop drawings.

2. Install panels in conformance with manufacturer’s written instructions. Anchor securely in place using clips and fasteners spaced in conformance with manufacturer’s written instructions for design wind load criteria.

3. Form seams with manufacturer-approved motorized seaming tool; completely engage panel, clip, and factory-applied sealant in seam.

4. Comply with methods and recommendations of SMACNA (ASMM) SMACNA Architectural Sheet Metal Manual for flashing configurations required.

5. Discrepancies between Project Site conditions and shop drawings shall be brought to the attention of Engineer for resolution.

6. Cutting and Fitting.

7. Dissimilar Metals or Materials.

B. Accessories: Install trims, flashings, and roofing specialties according to Drawings and manufacturer's recommended details.

C. Sealant Installation: Apply according to approved shop drawings and SMACNA (ASMM).

1. Provide airtight and waterproof installation.

3.4 CLEANING

A. Repairs:

1. Touch up paint is not required for panels with scratches that do not expose base metal.

2. Kynar® (PVDF- air dryable) touch up paint pens are recommended for minor scratches showing the substrate. Use minimal paint to fill scratch.

3. Panels or flashings with finish damage exposing metal or with substrate damage shall be replaced.

B. Cleaning and Waste Management:

1. At completion of each day's Work and at Work completion, sweep panels, flashings, and gutters clean. Do not allow fasteners, cuttings, filings, or scraps to accumulate.

2. Clean exposed surfaces of Work promptly after completion of installation.

3.5 PROTECTION

A. Protect Work as required to ensure that roofing shall be without damage at Final Completion.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Exterior rainscreen siding system:

1. Rainscreen clip and starter clip hidden fastener
2. Pre-drilled furring board
3. Milled wood siding
4. Milled wood trim and casing
5. Tongue and groove soffit board

B. Interior wood finish system

## 1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items.

## 1.4 PRE-INSTALLATION MEETINGS

A. Pre-Installation Meeting:

1. Meet at Project Site prior to delivery of finish carpentry materials and review condition and environmental controls required for proper installation and ambient conditioning in areas to receive Work.
2. Include in meeting Contractor, Engineer, installers of finish carpentry, wet Work including plastering, other finishes, painting, mechanical Work and electrical Work, and firms and persons responsible for continued operation (whether temporary or permanent) of HVAC systems as required to maintain temperature and humidity conditions.
3. Proceed with finish carpentry only when everyone concerned agrees that required ambient conditions can be properly maintained.

B. Convene minimum 2 weeks prior to starting Work of this Section.

1.5 SEQUENCING

A. Ensure that products of this Section are supplied to affected trades in time to prevent interruption of construction progress.

1.6 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

B. Shop Drawings: Provide manufacturer's standard details referenced to exterior and interior elevations of Drawings.

C. Selection Samples:

1. Sample 12 inches boards chosen wood specie milled to rainscreen clip pattern for use on soffits and ceilings.

2. Wood board of specie to be used with tinted finish applied 12 inches long.

D. Verification Samples: For each finish product specified.

1. Sample 12 inches boards chosen wood specie milled to rainscreen clip pattern for use on soffits and ceilings.

2. Wood board of specie to be used with tinted finish applied 12 inches long.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.

B. Installer Qualifications: Minimum 2 year experience installing similar products.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Engineer.

2. Do not proceed with remaining Work until workmanship is approved by Engineer.

3. Refinish mock-up area as required to produce acceptable Work.

4. Mockup of Rainscreen Clip system complete with milled siding of chosen wood specie, chosen dimension, and chosen profile, pre-drilled furring boards, Marine Grade Extruded Aluminum Starter Clips, Marine Grade Extruded Aluminum Rainscreen Clips and #10 1 inch Trim Head T25 Carbon Rainscreen Clip Screws, or #10 1 inch Trim Head T25 Stainless Steel Rainscreen Clip Screws (Stainless Steel.)

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handle materials to avoid damage.

C. Include in delivery of material a complete list of items shipped to include; wood grade and specie, board length, furring boards, hardware, finish, and any other product accessories delivered with the wood rainscreen system.

1. Mark FSC Certified wood with the CoC number on the packing list and the invoice.

D. Protect finish Carpentry during transit, delivery, storage, and handling to prevent damage, soiling, and deterioration. Wood shall be delivered on a tarped flatbed truck or an enclosed van for small quantities. Keep wood tarped or store indoors until installation.

E. Do not deliver finish carpentry materials until painting, wet Work, grinding, and similar operation which could damage, soil or deteriorate woodwork have been completed in installation areas. If finish carpentry must be stored in other than the installation areas, store only in areas meeting requirements specified for installation areas.

F. Do not allow finish carpentry to get wet.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Wood Haven, Inc., 800-545-8884; www.rainscreenclip.com.

2.2 WOOD PRODUCT QUALITY STANDARDS AND REQUIREMENTS

A. Softwood Lumber Standards: Comply with PS 20 and with applicable grading rules for the specie and product indicated.

B. Hardwood Lumber Standard: Comply with National Hardwood Lumber Association (NHLA).

C. Woodworking Standard: Where indicated for a specific product, comply with specified provisions of AWI (QCP).

D. Certified Wood: Materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC-STD-01-001.

2.3 EXTERIOR FINISH MATERIALS

A. Wood Rainscreen Wall:

1. Milled Wood Siding boards 1x6 with a 5 inches exposed face or a 1x4 with a 3 inches exposed face with a 3/16 inch milled groove separating the boards or milled with no groove for a closed face appearance best for use on vertical installations. Wood to be primed in factory with the initial coat of UV protectant wood sealer including tint, second coat to be applied after installation.

2. 1x3 wood furring boards pre-drilled to chosen profile pattern.

3. Fasteners and Anchorages: Marine grade extruded aluminum rainscreen clips with a Magni 599 corrosion resistant coating, Marine grade extruded aluminum rainscreen starter clips with a Magni 500 corrosion resistant coating, #10 1 inch Trim Head T25 Stainless Steel Rainscreen Clip Screws.

4. Wood trim in the specie chosen for inside and outside corners, transition boards, and trim for door and window openings with built in furring boards for concealed fastening, wood may be primed in factory with the initial coat of UV protectant wood sealer including tint, second coat to be applied after installation.

2.4 INTERIOR FINISH MATERIAL

A. Wood Rainscreen Wall:

1. Milled Wood Siding boards in random/long lengths generally ranging from 8 feet to 18 feet, 1x6 with a 5 inches exposed face or a 1x4 with a 3 inches exposed face with a 3/16 inch milled groove separating the boards or milled with no groove for a closed face appearance best for use on vertical installations, wood may be primed in factory with the initial coat of UV protectant wood sealer including tint, second coat to be applied after installation.

2. 1x3 wood furring boards pre-drilled to chosen profile pattern

3. Fasteners and Anchorages: Marine grade extruded aluminum rainscreen clips with a Magni 599 corrosion resistant coating, Marine grade extruded aluminum rainscreen starter clips with a Magni 500 corrosion resistant coating, #10 1 inch #10 1 inch Trim Head T25 Stainless Steel Rainscreen Clip Screws.

B. Tongue and Groove with Quirk:

1. Wood boards of chosen specie boards milled to a tongue and groove pattern, 1x6 with a 5 inches exposed face or a 1x4 with a 3 inches exposed face with a 3/16 inch milled groove separating the boards or milled with no groove to mirror the rainscreen clip system application for use on ceilings, soffits and interior walls where furring is not needed, wood may be primed in factory with the initial coat of UV protectant wood sealer including tint, second coat to be applied after installation.

2. Fastened through the back of the groove with finish nails directly into the substrate material.

## 2.5 WOOD SPECIES

A. Species: Ipe (Tabebuia SPP)

1. Brazilian Hardwood, often called Brazilian walnut, exotic wood from South America, dark brown in color, hard, strong, and naturally resistant to rot, abrasion and weather. Twice as dense as most woods and up to 5 times harder.

2. Fire Resistance:

a. NFPA Class A

b. UBC Class 1

c. Flame Spread Index (10 minute): 0

d. Flame Spread Index (30 minute): 5

e. Smoke Developed Value (10 minute): 3

3. Density and Buoyancy:

a. Janka Rating - 3680

b. Average Weight: 72 lb/cf

c. Specific Gravity: 0.92

4. Workability: Dries extremely well with little checking, twisting, or bow. Difficult to work with, especially with hand tools. It can have a blunting effect on cutting edges, pre-drilling for nails, and screws is required. It comes in long lengths with limited warp. Planks do not bend well. Finishes and sands quite smoothly, with no splintering.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

## 3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under Project conditions.

C. Condition wood material to average prevailing humidity conditions in installation areas prior to installing.

## 3.3 INSTALLATION

A. Install in conformance with manufacturer's written instructions.

B. Refer to Drawings for information pertaining dimension of milled siding, treatment of corners whether that be mitered boards, or wood corner boards with built-in furring for concealed fastening, trim for doors, and windows with built in furring for concealed fastening.

C. Discard units of material which are unsound, warped, bowed, twisted, not adequately seasoned, or which are of defective manufacture with respect to surface, size, or pattern.

D. For installation on exterior walls install over a moisture barrier.

E. Install Work plumb, level, true, and straight with no distortions. Shim as required using concealed shims.

F. Refinish cut surfaces or repair damage finish at cuts by applying the final coat of wood finish on the entire surface of the wood wall.

G. Anchorage of Finish Carpentry:

1. Install vertical or horizontal pre-drilled furring boards to the substrate wall using fastener appropriate to provide a sufficient anchor to the substrate.

2. Install corner trim, window and door trim, and transition boards prior to installation of milled siding boards.

3. Install extruded aluminum concealed clips securing with supplied Trim Head T25 stainless steel screws at an angle into the pre-drilled points on the furring boards.

H. Carefully coordinate electrical requirements and wiring with millwork installation.

3.4 PROTECTION

A. Repair damaged and defective finish carpentry Work wherever possible to eliminate defects functionality and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.

B. Clean finish carpentry Work on exposed and semi-exposed surfaces. Apply a complete top coat of wood finish to exposed and semi-exposed surfaces.

C. Installer of finish carpentry shall advise Contractor of final protection and maintained conditions necessary to ensure that Work shall be without damage or deterioration at the time of acceptance.

D. Protect installed products until completion of Project.

E. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Flashing and sheet metal Work.

1.2 RELATED SECTIONS

A. Section 09 90 01 - Painting for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires flashing and sheet metal.

1.4 REFERENCES

A. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

B. ASTM A506 - Standard Specification for Alloy and Structural Alloy Steel, Sheet and Strip, Hot-Rolled and Cold-Rolled.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

D. ASTM B32 - Standard Specification for Solder Metal.

E. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension.

F. ASTM F547 - Standard Terminology of Nails for Use with Wood and Wood-Base Materials.

G. SMACNA (ASMM) - Architectural Sheet Metal Manual.

1.5 SUBMITTALS

A. Shop drawings shall be required for shop fabricated items, indicating details of fabrication and installation.

1.6 FIELD CONDITIONS

A. Verify actual field conditions and measure prior to fabrication of sheet metal Work.

1.7 SHOP INSPECTION

A. Shop fabricated items shall be inspected at no cost to Contractor, if fabricator is within Los Angeles or Orange County. Otherwise, a charge shall be made for inspector's travel time.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sheet metal: Pure iron, copper-molybdenum or copperbearing steel sheets per ASTM A506 as specified. Minimum 24 gauge unless otherwise noted.

B. Steel sheet: Galvanized per ASTM A653/A653M, zinc coating equal to G90.

C. Stainless steel (Work Bench): 18 gauge, Type 302 where required to be welded; No. 4 finish.

D. Solder shall be per ASTM B32, composed of not less than 40 percent block tin; with manufacturers name, class and grade.

E. Flux: Muriatic acid killed with zinc or an approved brand of soldering paste. Use flux for stainless steel when soldering same.

F. Tin used for tinning of irons, seams, and other items shall be pure block tin.

G. Flashing cement shall be neoprene, ASTM D412, trowel grade having 500 psi tensile strength and 250 percent elongation.

H. Fastenings shall be as follows:

1. Bolts per ASTM A307.

2. Screws.

3. Nails per ASTM F547.

4. Stainless steel for fastening of stainless steel items of same alloy as sheet stainless.

5. Annular type nails for securing sheet metal items to wood.

6. Rivets to be soft iron with rust-resistive coating when used with ferrous metals.

I. Paint primer (for uncoated ferrous metals) shall be Rust-Oleum Corporation X-60 Base Metal Red Primer.

J. Roofer's cement: Type I, Black, as recommended by flashing manufacturer.

K. Adhesives shall be Presstite Division No. 243 or 3-M Company No. 1357.

PART 3 - EXECUTION

3.1 DUCTS AND SHEET METAL

A. Forming shall be per SMACNA (ASMM) Sand as follows:

1. Molded and braked members shall be finished with straight, sharp lines, and angles and coped for fit and solder at intersections.

2. Turn back exposed edges 1/2-inch.

3. Provide for expansion and contraction in Work.

4. Pressure coating and avoid scarring or breaking.

5. Fabricate for weathertight finished Work.

B. Joints shall be as follows:

1. Lock-seam Work flat and to line and joint by full solder sweated joints.

2. Flat lock seams and soldered lap seams to be at least 1/2-inch wide.

3. Lap seams (which are not soldered) to lap according to pitch but in no case less than 3-inches.

4. Make flat and lap seams in direction of flow.

C. Soldering shall be as follows:

1. Joints shall be cleaned and tinned.

2. Work to be done with heated well-tinned soldering coppers of design and weight for Work.

3. Heat seams and completely fill with solder.

4. Make exposed soldering on finished surfaces neat, full flowing and smooth.

5. Wash acid-fluxed Work with soda solution after soldering.

6. Tinning required on both sides of edges of stainless steel for width of 1-1/2 inches.

D. Shop coating shall be as follows:

1. Clean and pretreat with a phosphoric and vinyl resin primer.

2. Apply 1 coat of X-60 primer.

3.2 ROOFING SHEET METAL WORK

A. Surfaces to which sheet metal is to be applied or attached shall be brushed clean and free from projections that would prevent a waterproof secure installation.

B. Copings shall be as follows:

1. 20 gage stainless steel.

2. Fabricate to profile indicated; secure in place, level, straight and in line, with 20 gage stainless steel slip anchors for concealed fastening wherever possible. Where necessary for exposed fastening use screws with lead washers. Provide shop fabricated corner units. Make sectional joints standing seams minimum 5/8-inch high.

C. Metal flashings shall be as follows:

1. Install as necessary for watertight construction.

2. Minimum 22 gage galvanized sheet steel.

3. Fabricate and install in accordance with details on Drawings and SMACNA (ASMM). Lock and solder joints.

D. Flashing for roof penetrations shall be as follows:

1. 20 gage galvanized sheet steel.

2. Fabricate and install sleeves to extend no less than 6 inches above roof surface, sized to fit conduit or penetration and sealed watertight. Flange of flashing shall extend 4 inches in every direction and adhered to roofing membrane.

E. Equipment platform covers shall be as follows:

1. Minimum 24 gage galvanized sheet steel.

2. Fabricate and install details on single sheet with turned down aprons, drip edges, mitered, and welded corners. Secure in place by means of sheet metal clip anchors.

3.3 METAL DRIP

A. Required: On head of exterior doors which open to the outside, install metal drip as detailed on the reviewed shop drawings.

B. Metal drips shall be 24 gage galvanized sheet steel.

C. Fabricate and install to shapes, dimensions and details indicated on reviewed shop drawings.

3.4 MISCELLANEOUS

A. Provide sheet metal Work not specifically described but necessary to complete Project.

3.5 SHOP PAINTING

A. Paint uncoated ferrous metal, but do not paint galvanized ferrous metal and stainless steel.

B. Painting:

1. Apply 1 coat of primer 1.5 mils to 2 mils thick.

2. Apply 2 coats on surfaces which shall be inaccessible after fabrication and erection, total thickness of coatings to equal 4 mils.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Calking materials

B. Sealant materials

1.2 RELATED SECTIONS

A. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires joint sealants.

1.4 REFERENCES

A. ASTM D1752 - Standard Specification for Preformed Sponge Rubber, Cork, and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.5 SUBMITTALS

A. Submit samples of materials proposed for substitution for review prior to delivery of materials to Project Site. Each sample shall bear manufacturer's name and technical data.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver calking and sealant materials to Project Site in original, unbroken, and unopened containers bearing the manufacturer's brand name and statement that material conforms to the specified standard.

1.7 WARRANTY

A. Warranty period specified in GENERAL CONDITIONS Section, shall be extended to 2 years for Work in this Section. Contractor to provide written warranty and file 5 copies of same with Engineer as a prerequisite for final acceptance of Work.

## PART 2 - PRODUCTS

### 2.1 CALKING MATERIALS

A. W.R. Grace & Co., "Hornflex NS Standard Gun Grade" or Thiokol polysulfide calk shall be provided for joints other than those to receive sealant; including miscellaneous vertical joints, door frames, and elsewhere. Sealant color shall blend with area or material it is sealing or calking.

B. Calking stop shall be polyethylene having a diameter 25 percent larger than joint.

C. Oakum shall be made of untarred, picked loose, fine hemp fibers.

### 2.2 SEALANT MATERIALS

A. For expansion joints, the following shall be used:

1. Filler, plain type for use with elastomeric sealers in conformance with ASTM D1752. Type selected shall be consistent with manufacturer’s written instructions with the selected joint sealant.

2. Asphalt Sealant: W.R. Meadows Safe-Seal 3405

3. Portland Cement Concrete Pavement Joint Sealant: Dow Corning 890 SL silicone.

4. Primers, Joint Backing, and Bond Breakers: As recommended in the latest published data sheet of the sealant manufacturer.

### 2.3 CITY OF LOS ANGELES GREEN BUILDING CODE

A. Materials shall comply with City of Los Angeles Green Building Code requirements.

1. Enter pertinent product data in VOC Content Verification Checklist form and provide product specification sheets. Make checklist and specifications available to City of Los Angeles Department of Building and Safety inspector through Engineer upon request. VOC Content Verification Checklist form can be found here: https://ladbs.org/docs/default-source/forms/green-building-2023/grn_2_voc_content_verification_checklist-01.17.23.pdf?sfvrsn=19f4c153_10.

## PART 3 - EXECUTION

### 3.1 PREPARATION

A. Prior to installation of calking and sealant materials, correct conditions that may impair proper installation.

B. Joints shall be free from foreign materials for the full depth of joint. Joint surfaces shall be clean of grease, oil, wax, or other foreign matter and dry.

C. Joint surfaces shall be primed in conformance with sealant or calking manufacturer's written instructions.

### 3.2 INSTALLATION

A. Installation shall be in conformance with the manufacturer's written instructions and by manufacturer's approved applicator.

B. Adjoining surfaces shall be protected from staining. Provide masking to limit extent of calking and sealant material application to joints.

C. Fill joints where no backing exists partially with filler material that is compatible with specified calking or sealant material in conformance with the following requirements:

1. Metal to metal joints shall have a minimum joint width of 1/4 inch.

2. Minimum joint depth 1/2-inch for concrete, masonry, and plaster.

3. Other joints shall have a maximum of 3/4 inch width.

D. Apply sealants under sufficient pressure to completely fill joint.

E. Apply nonsagging type sealants in vertical joints.

F. Apply self-leveling type sealants in horizontal joints.

G. Finish exposed joints smooth and flush with surface unless Drawings show to be recessed.

H. Provide strippable masking for factory applied sealing materials to prevent dirt contamination until parts are assembled.

I. Apply non-tracking sealants having a Shore A hardness range of 35 to 45 to expansion joints subject to foot or vehicular traffic.

J. After installation, remove calking or sealant from adjacent surfaces not specified to receive sealant or calking.

3.3 FIELD QUALITY CONTROL

A. If leakage results from failure of sealant or calking to bond to adjacent Work or if sealant or calking hardens, cracks, shrinks, runs, or stains adjacent Work, remove defective Work. Clean joints and install new calking or sealant with Engineer approved material only.

3.4 SCHEDULE

A. Multi-part sealants shall be used in expansion and contraction joints and joints in concrete surfaces.

B. Elastomeric calking joint compound shall be used in expansion joints and contraction joints where limited movement is anticipated and areas where general calking is required.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Hollow metal doors and frames including the following:

1. Louvers

2. Other metal panels and frames

1.2 RELATED SECTIONS

A. Section 04 22 00 - Concrete Unit Masonry

B. Section 05 05 14 - Treating Damaged Galvanizing

C. Section 05 50 00 - Metal Fabrications

D. Section 08 71 00 - Door Hardware

E. Section 09 90 01 - Painting for Exterior Improvements

F. Section 09 96 00 - High-Performance Coatings

G. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires hollow metal doors and frames.

1.4 REFERENCES

A. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.

E. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

1.5 SUBMITTALS

A. Submit the following to Engineer for review and approval:

1. Product data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

2. Shop drawings showing fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

3. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Drawings.

a. Indicate coordination of glazing frames and stops with glass and glazing requirements.

## 1.6 QUALITY ASSURANCE

A. Provide steel doors and frames in conformance with American National Standard Institute/Steel Door Institute's (ANSI/SDI) Recommended Specifications: Standard Steel Doors and Frames unless specified and noted otherwise on Drawings.

B. Construct fire-rated hollow metal doors and frames in conformance with Underwriters Laboratories, Incorporated (UL) requirements for the indicated fire ratings, and attach the appropriate UL labels to them at the factory before their shipment.

C. For determining gages of doors and frames and for determining galvanizing of doors and frames the following applies:

1. Interior doors and frames are those which are protected from the weather by an overhang or roof of at least 15 feet from center of door.

2. Exterior doors and frames are those which are not protected from the weather by an overhang or roof of at least 15 feet from the center of door.

D. Provide neoprene silencers at metal frames for hinged non-rated doors except where silencers are already included under the listings contained in each Hardware Set of DOOR HARDWARE Section.

## 1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal Work in cartons or crates providing protection during transit and Project storage. Provide additional sealed plastic wrapping for factory-finished doors.

B. Inspect hollow metal Work upon delivery to Project Site for damage. Minor damage may be repaired at Project Site provided refinished Work is equal to new Work and acceptable to Engineer; otherwise, remove and replace damaged Work.

C. Store doors and frames at Project Site protected from weather. Follow special storage and handling requirements of the manufacturer.

D. Identify each door and frame with individual opening numbers which correlate with the designation system used on shop drawings for door, frames, and hardware, using temporary markings that are easily removed without trace.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Steelcraft, (513) 745-6400

B. Republic Builders Products, (562) 946-6373

2.2 DESCRIPTION

A. Non-acoustical doors:

1. Doors shall be SDI Models 3 or 4 (seamless), Grade III, Extra Heavy Duty at exterior doors and Grade II, Heavy Duty at interior doors. Provide 14 gage faces with 14 gage end closures at exterior doors and 16 gage faces with 16 gage end closures at interior doors.

2. Hollow metal frames shall be combination type (one piece) constructed of 16 gage steel at interior frames and 14 gage steel at exterior frames, with corners mitered, welded and ground smooth. Thickness of fire rated door frames shall be in conformance with testing laboratory requirements, but shall in no case be less than those specified in this Section.

B. Other metal thicknesses shall be as follows:

1. Hardware reinforcing:

a. Butts: 8 gage for doors and frames.

b. Locks: 12 gage for doors and frames.

c. Surface applied hardware: 12 gage for doors and frames.

d. Dust covers: 20 gage.

e. Reinforcement for pull plates and bars: 16 gage. (Through bolts are not permitted).

2. Framing anchors: 14 gage minimum.

3. Stiffener channels: 16 gage.

4. Face sheet channel reinforcements: 20 gage.

5. Glazing stops: 16 gage.

6. Pull plates and bars: 16 gage.

7. Astragals: 1/8 inch by 1 3/4 inch for the full height of door.

2.3 MATERIALS

A. Hot rolled steel sheets and strip: Commercial quality, carbon steel, pickled and oiled, complying with ASTM A1011/A1011M.

B. Cold-rolled steel sheets: Commercial quality, Class 1 carbon steel, complying with ASTM A1008/A1008M.

C. Galvanized steel sheets shall be commercial quality, Class 1, zinc coated carbon steel sheets, complying with ASTM A653/A653M; G90 zinc coating.

D. Fabricate supports and anchors of not less than 14 gage galvanized sheet steel. If welded in anchors are not used, use lock in anchors.

1. Provide adjustable anchors for frames set in masonry.

E. Inserts, bolts, and fasteners: Manufacturer's standard units, galvanized in conformance with ASTM A153/A153M, Class C or D.

F. Door cores shall be as specified in publication SDI 100, paragraph 2.2.3. However, polyurethane and polystyrene core materials specified in subparagraphs 2.2.3.2 and 2.2.3.3 shall not be permitted. Filler for fire rated doors shall be City of Los Angeles approved material.

G. Paint:

1. Shop primer: Manufacturer's standard rust-inhibitive shop paint, thermosetting, compatible with specified finish paint.

2. Touch-up of damaged galvanized surfaces shall be in conformance with TREATING DAMAGED GALVANIZING Section.

3. Finish:

a. Exterior Doors and Frames: Finish both sides as specified in HIGH-PERFORMANCE COATINGS Section.

b. Interior Doors and Frames: Finish as specified in PAINTING FOR EXTERIOR IMPROVEMENTS Section.

## 2.4 FABRICATION

A. General:

1. Fabricate Work by roll-forming, brake-forming, and welding to produce hollow metal Work with straight and square edges with surfaces free of defects.

2. Fit and fabricate Work with surfaces free from warp, wave, buckle, or other defects, as approved by Engineer.

3. Conform to AWS standards for welding. Grind exposed welds flush and smooth with parent metal.

4. Fit and assemble units in manufacturer's plant to wherever possible. Clearly identify Work not permanently factory assembled before shipment assuring assembly at Project Site.

5. Fabricate doors and frames located in exterior walls from zinc-coated galvanized steel; of the specified gage and touch-up abraded spots with zinc rich primer. Galvanize in conformance with METAL FABRICATIONS Section.

6. Shop-primed finish for interior metal door frames:

   a. Clean steel surfaces of mill scale, rust, oil and other foreign materials after their assembly and grind welds and fabrication marks flush and smooth with parent metal. Fill dents and depressions with metal filler before applying the shop primer. Hollow metal doors and frames with visible spot welds, dents, depressions, oil canning and other defects shall not be acceptable.

   b. Apply pretreatment to cleaned metal surfaces.

   c. Apply shop primer within time limits recommended by pretreatment manufacturer to provide a smooth coat of even consistency, with a uniform dry film not less than 1 1/2 mils thick.

7. Preparation for finish hardware:

   a. Reinforce the hollow metal doors and door frames for finish hardware in conformance with SDI Publication 100, Table IV, and locate finish hardware in conformance with Table V of this publication, except where handicap regulations are in conflict, in which case comply with handicap regulations.

b. Cut, drill and tap the hollow metal doors and door frames to receive finish hardware in conformance with the hardware manufacturer's written instructions and templates. Drill and tap doors and door frames in the field to receive surface-applied hardware. Provide reinforcement for closers on hollow metal doors and frames.

8. Provide removable moldings for placed openings in doors. Use countersunk screws spaced not more than 12 inches on centers.

9. Construct louvers integral with and welded into the door. Finish flush with face sheets of door. Screw attachment or overlapping molding not acceptable. Louvers shall comply with the following:

   a. Stationary.

   b. Frame shall be flush, 20 gage.

   c. Blades shall be inverted V, 24 gage.

   d. Finish shall be the same as the finish of the door on which the louver is installed.

10. After assembly, clean and grind smooth fabrication marks. Apply one coat of epoxy mineral filler to conceal spot welds. Doors with visible spot welds before or after application of finish paint are unacceptable.

11. Construct transom and other panels as for steel doors. Provide concealed fasteners.

12. Construct and finish window, transom, louvers, and other frames as for door frames. Provide one integral stop and one removable channel-shaped stop with mitered corners secured in place with oval head, Phillips slot, countersunk screws. Construct louvers in conformance with details on Drawings.

B. Fire-rated assemblies shall be factory fabricated by door and frame manufacturers to meet fire-rated assembly requirements and as required by governing jurisdiction.

1. Provide astragals approved for use in fire-rated assembly.

2. Corridor door, unless noted otherwise, shall qualify for a minimum 20 minute fire-rating.

C. Coordinate the accessories for mounting hardware so that ratings are not compromised. See DOOR HARDWARE Section.

PART 3 - EXECUTION

3.1 INSTALLING FRAMES

A. Set frames in their scheduled location, plumb, straight, square, and rigid.

1. Comply with Drawings and ANSI/SDI A250.11. Brace frames to prevent their displacement during erection of adjacent walls.

2. Coordinate the installation of built-in anchors for wall and partition construction with related trades. Refer to CONCRETE FOR EXTERIOR IMPROVEMENTS and CONCRETE UNIT MASONRY Sections.

3. Avoid overlapping steel vertical and horizontal studs which produces oversize walls.

4. Follow frame manufacturer's written instructions on opening size.

5. Install fire-rated frames in conformance with UL tested procedures.

B. Provide UL tested adjustable floor clips for frames. Anchor clips to floor with power-driven pins or bolts in expansion shields.

C. Leave door frame spreader bars intact, wherever possible, until frames are set square and plumb and anchors are attached and grouted where required. Leave surfaces smooth and undamaged.

D. Anchors:

1. In masonry walls: Use floor anchor and 3 jamb anchors for each jamb for frames up to 7 feet high and one additional anchor for each additional foot or fraction thereof above 7 feet height.

2. Locate anchors at hinges in hinge jamb and at corresponding position in the strike jamb.

3.2 HANGING DOORS

A. Hang doors in conformance with manufacturer's written instructions, and adjust to the clearances specified in SDI Publication 100, paragraph 2.2.1, except where more stringent clearances are indicated on Drawings or required by UL listing for fire-rated doors.

B. Do not install doors warped, bowed, dented, or otherwise damaged.

C. Adjust hardware so that doors operate freely for their entire travel, but not loosely, without sticking or hinge binding, with hardware adjusted and functioning.

3.3 TOUCH-UP

A. Clean damaged primer in damaged area, sand smooth, reclean, and spot-prime with a paint compatible with the primer and the scheduled finish coats.

B. Repair damaged galvanized finish in conformance with TREATING DAMAGED GALVANIZING Section.

3.4 PROTECTION

A. Protect installed doors and frames.

B. Remove protection immediately prior to inspection for completion.

3.5 ADJUSTMENT

A. Check and readjust operating finish hardware items.

3.6 REPLACEMENT

A. Replace hollow metal doors and frames damaged beyond satisfactory field repair, with new products at no additional cost to Department.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Tubular daylighting devices (TDD) and accessories.

1.2 RELATED SECTIONS

A. Section 26 50 00 - Lighting

1.3 PRICE AND PAYMENT PROCEDURE

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. 29 CFR 1910.23 - Ladders.

B. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products.

C. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights.

D. ASTM A463/A463M - Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

F. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

G. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

H. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

I. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics.

J. ASTM D2843 - Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics.

K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

L. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings.

M. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

N. ASTM E308 - Standard Practice for Computing the Colors of Objects by Using the CIE System.

O. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

P. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

Q. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference.

R. ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.

S. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.

T. CSA C22.2 No. 250 - Lighting Systems.

U. FEMA P-361 - Safe Rooms for Tornadoes and Hurricanes: Guidance for Community and Residential Safe Rooms.

V. GSA TS01 - Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings; General Services Administration.

W. ICC-ES AC16 - Acceptance Criteria for Plastic Glazed Skylights.

X. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources.

Y. UL 1598 - Luminaires.

Z. UL 1715 - Standard for Safety Fire Test of Interior Finish Material.

AA. UL 2108 - Low Voltage Lighting Systems.

BB. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products.

1.5 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Data sheets showing roof dome assembly, flashing base, reflective tubes, diffuser assembly, and accessories.

4. Installation requirements.

B. Shop Drawings. Submit shop drawings showing layout, profiles, and product components, including rough opening and framing dimensions, anchorage, roof flashings, and accessories.

C. Electrical wiring diagrams and recommendations for power and control wiring.

D. Verification Samples: As requested by Engineer.

E. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.

F. Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with proposed features:

1. LED Luminaires: Include estimated useful life, calculated based on IES LM-80 test data.

2. To meet IES LM-80 lifetime projections, LM-80 Max Drive Current shall not be exceeded. Lumen maintenance and lifetime predictions are valid for drive current and case temperature conditions used for LM-80 testing as included in the applicable IES LM-80 test report for these products.

G. LEED Submittals: Provide documentation of how the requirements of Credit shall be met:

1. List of Daylight Credits available for the products specified.

2. Data on Energy Optimization Performance Credits for the products specified.

3. Data on Perimeter and Non-Perimeter Controllability of Systems for use of Daylight Dimmer option with the products specified.

4. Data on potential Innovation in Design Credits which may be available for the innovative use of the products specified.

1.6 PERFORMANCE REQUIREMENTS

A. Daylight Reflective Tubes: Spectralight Infinity with INFRAREDuction Technology combines ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance. Patented spectrally-selective optical surface yields an average total- and specular-reflectance for the Visible Light spectrum (400 nm to 700 nm) providing maximized visible light transmission and less than 25 percent reflectance for Infrared (IR) heat wavelengths (750 nm to 2500 nm) for minimized heat transmission, resulting in a spectrally-selective Total Solar Spectrum (250 nm to 2500 nm) reflectance less than 37 percent, as measured using a Perkin Elmer Lambda 1050 spectrophotometer with a Universal Reflectance Accessory. Color: Shall not exceed plus 2 or be less than minus 2 as determined in conformance with ASTM E308.

B. BRIGHTEN UP 290 DS (Hard Ceilings)

1. AAMA/WDMA/CSA 101/I.S.2/A440, Class CW-PG70 size tested 14 inch, Type TDDCC.

a. Air Infiltration Test: Air infiltration shall not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 pounds per square feet (psf) across the tube when tested in conformance with ASTM E283/E283M.

b. Water Resistance Test:

1) Passes water resistance; no uncontrolled water leakage with a pressure differential of 10.7 psf (512 Pa) or 15 percent of the design load (whichever is greater) and a water spray rate of 5 gallons/hour/sf for 24 minutes when tested in conformance with ICC-ES AC16, ASTM E547 and ASTM E331.

c. Uniform Load Test: Units tested with a safety factor of 3 for positive pressure and 2 for negative pressure, acting normal to plane of roof in conformance with ASTM E330/E330M.

1) No breakage, permanent damage to fasteners, hardware parts, or damage to make system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf 1 pounds per square inch (psi) or Negative Load of 60 psf 0 psi in conformance with ICC AC-16 Section A, or Negative Load of 70 psf (3.35 kPA) if tested per ICC AC-16 Section B.

d. Fire Testing:

1) When used with the Dome Edge Protection Band, domes meet fire rating requirements as described in the International Building Code.

2) When used with Dome Edge Protection Band and Rooftop Fire Glazing, domes meet prescriptive method of Option 1 of IBC 708A.2.1 and IWUIC 101.2.

3) Self-Ignition Temperature - Greater than 650 degrees Fahrenheit per ASTM D1929.

4) Smoke Density: Rating no greater than 450 per ASTM E84 in way intended for use. Classification C.

5) Rate of Burn and/or Extent: Maximum Burning Rate: 2.5 inches/min 2.44 inch /min) Classification CC-2 per ASTM D635.

6) Rate of Burn and/or Extent: Maximum Burn Extent: 1 inch Classification CC-1 per ASTM D635.

2. LED Light Kit:

    a. TUVus Marking and Certification for North American Market

    b. FCC: This device complies with part 15 of the FCC Rules

    c. CE Marking and Certification for European Market

    d. California Prop 65: Tested for presence of:

        1) Lead less than or equal to 30ppm in any component per CPSC-CH-E-1003-09, CPSC-CH-E-1001-08.3, and CPSC-CH-E-1002-08.3 Analysis: AAS/ICP-OES

        2) DEHP less than or equal to 30ppm, DBP less than or equal to 30ppm, BBP less than or equal to 30ppm, DINP less than or equal to 50, DIDP less than or equal 50ppm, DnHP less than or equal 30ppm in any component per: CPSC-CH-E-1003-09.4, GC/MS

    e. RoHS: Complies with EU RoHS Directive 2011/65EU Annex II and amendment (EU) 2015/863

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Primary products specified in this section shall be supplied by a single manufacturer with a minimum of years experience in the top lighting industry. Secondary products shall be acceptable to the primary manufacturer.

1. Installer Qualifications: Products shall be installed by a single installer with a minimum of five years demonstrated experience, with adequate equipment, skilled workers, and practical experience to meet Project schedule. For a list of qualified installers please contact Robert Busolo at 760-597-4424, commsocalbusiness@solatube.com

B. Skylights shall conform with authorities having jurisdiction and be designed to meet design criteria of Project location and the following:

1. Skylights shall be certified by National Fenestration Rating Council (NFRC).

2. Skylights shall be Tested and labeled in conformance with AAMA/WDMA/CSA 101/I.S.2/A440.

3. Skylights shall have Factory Mutual (FM) Approval Class Number 4431.

4. Meet or exceed Occupational Safety and Health Administration (OSHA) 200 pound (90 kg) Drop Tests expressed in 29 CFR 1910.23(e)(8).

5. Skylights shall provide minimum 69 psf 0 psi design load.

C. LED Lighting and controls shall be designed to meet criteria of Project, and conform with authorities having jurisdiction, and the following:

1. Integration with Building Management Systems (BMS) and Heating, Ventilation and Air Conditioning (HVAC) equipment.

2. Product Safety Marking, Certifying compliance with:

a. UL 1598 - Luminaires

b. UL 2108 - Low Voltage Lighting Systems.

c. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products

d. CSA C22.2 No. 250.0 - Luminaires

3. FCC Rules Part 15

4. California Prop 65:

5. EU RoHS Directive 2011/65EU Annex II and amendment (EU) 2015/863.

D. Pre-Installation Meeting: Contractor shall convene a pre-installation meeting on Project Site minimum 1 week before beginning work of this Section. The meeting shall include Engineer to:

1. Coordinate between the at least the following trades.

a. Roofing to install the flashing, skylight, and LED Light Kit. Cut holes in roof deck, and flash curb to deck.

b. Ensure clear paths for TDD units and coordinate with mechanical so not to interfere with pathways.

c. Electrical to wire components and program lighting controls.

2. Verify Project requirements and Project Site logistics.

3. Assess integrity of the roofing system and building structure.

4. Review manufacturer's written instructions and warranty requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in a cool dry location protected from the weather and in Manufacturer's original unopened containers until ready for installation.

B. Store products in manufacturer's unopened packaging until ready for installation.

1.9 FIELD CONDITIONS

A. Coordinate delivery schedule with Contractor and Project schedule to minimize on Project Site storage.

B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

C. Store materials in a dry area, protected from freezing, staining, contamination or damage.

1.10 WARRANTY

A. Daylighting Device: Manufacturer's standard warranty for 10 years.

B. Electrical Parts: Manufacturer's standard warranty for 5 years, unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Solatube International, Inc., Michelle Weisman Tel: (818) 577-9952; Email: (mweisman@solatube.com); Web:http://www.solatube.com

B. No substitutions permitted.

2.2 TUBULAR DAYLIGHTING DEVICES

A. Tubular Daylighting Devices General: Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.

B. Brighten Up Series: Solatube Model 290 DS: 13.78 inch Daylighting System:

1. Model:

a. Solatube Model 290 DS used for daylighting systems with suspended or hard ceilings, AAMA Type TDDCC.

2. Capture Zone:

a. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.

1) Outer Dome Glazing: Type DA, 0.125 inch minimum thickness impact resistant injection molded acrylic classified as CC2 material; UV inhibiting (100 percent UV C, 100 percent UV B and 98.5 percent UV A), impact modified acrylic blend.

a) Raybender 3000: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.

2) Tube Ring: Attached to top of base section; 0.090 inch nominal thickness injection molded high impact acrylic; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.

3) Dome Seal: Polyethylene foam seal, black, 0.13 inch thick by 14.61 inch diameter, 2 PCF polyethylene foam.

4) LightTracker Reflector, made of aluminum sheet, thickness 0.015 inch with Spectralight Infinity. Positioned in the dome to capture low angle sunlight.

b. Flashings:

1) Roof Flashing Base:

a) One Piece: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube. Sheet steel, corrosion resistant conforming to ASTM A653/A653M or ASTM A463/A463M or ASTM A792/A792M, 0.028 inch plus or minus 0.006 inch thick.

1 Base Style: Type FC, Curb Cap, with inside dimensions of 27 inches by 27 inches (685 mm by 685 mm) to cover curb as specified in FLASHING AND SHEET METAL Section.

c. Curbs: Metal Insulated Roof Curb: Corrosion resistant 18 Gauge hot-dipped galvanized steel conforming to ASTM A653/A653M G90 with continuous welded seams, integrated base plate for water tightness and extra strength, lined with 1-1/2 inch fiberglass fireproof sound attenuating thermal insulation, factory installed 2 by 2 treated wood nailer secured to top ledge of curb. Curb designed for single-ply roofing, lightweight fill, or tapered insulation low slope roof types.

1) C12 12 inch high Metal insulated curb

2) Flashing Options:

a) Curb Cap Insulation: Type CCI, nominal 1 inch thick thermal isolation pad to reduce thermal conduction between curb-cap and tubing and thermal convection between room air and curb-cap. Rated R-6 (OFxft2xhr/Btu) Insulation is Polyisocyanurate foam utilizing CFC, HCFC, and HFC free blowing agent. Type-1 Class-1 per ASTM C1289; Passes UL 1715 (15-minute thermal barrier per IBC 2603.4); Attic ventilation may be required per IBC 1203.2(OFxft2xhr/Btu)

3. Transfer Zone:

a. Extension Tubes: Aluminum sheet, thickness 0.015 inch.

1) Reflective Tubes:

a) Reflective Extension Tube: Type EXX with total length of run as indicated on Drawings.

b) Interior Finish: Spectralight Infinity with INFRAREDuction Technology combining ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance.

c) Color: shall not exceed plus 2 or be less than minus 2 as determined in conformance with ASTM E308.

4. Delivery Zone:

    a. Ceiling Ring: Injection molded impact resistant acrylic. Nominal thickness is 0.110 inches.

    b. Ceiling Ring Seal: Polyethylene foam seal, white, 0.25 inch wide by 0.19 inch high, 2 PCF polyethylene foam with low-tack pressure sensitive adhesive.

    c. Upper glazing: PET GAG plastic with EPDM low density sponge seal to minimize condensation and bug, dirt, and air infiltration per ASTM E283. The nominal thickness is 0.039 inches.

        1) Natural Effect Lens: Type LN.

    d. Round Diffusers/Decorative Fixtures: Dual Glazed Diffuser Assembly.

        1) Lower glazing with integral injection molded acrylic Dress Ring classified as CC2 material. Nominal thickness is 0.110 inches.

            a) OptiView Diffuser: Type L7 (Narrow), OptiView Micro-replicated lens design to maximize light output and diffusion. Visible Light Transmission shall be greater than 90 percent at 0.022 inch thick. Classified as CC2.

5. Delivery Zone Options:

        1) LED Light Kit: Including driver and light engine two piece field assembly, bracket mounted inside system, cTUVus Listed.

            a) Type (LED); Long-lasting, high performance, non-replaceable light source, LED integrated in Light Engine.

            b) Electrical Input (AC~) 100-240V, 1.1A, 50/60Hz; 277V, 0.5A, 50/60Hz.

            c) Light Engine: CCT 4,000 degrees K, CRI 80, at 1440 mA Nom Drive Current and Tc 77 degrees Fahrenheit: Typ Pulsed Flux 12,075 lm.

            d) LED Output: 3,250 delivered lumens.

            e) Lumen Maintenance Rating (L70): ≥60,000 Hr/105 degrees C Case Temp: (87.66 percent) of Initial (lm), Per (TM-21).

2.3 ACCESSORIES

A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.

B. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Examine openings, substrates, structural support, anchorage, and conditions for compliance with requirements for installation tolerances and other conditions.

C. If substrate and rough opening preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Coordinate requirements for power supply, conduit, and wiring.

C. Prepare surfaces using the methods recommended by manufacturer for achieving the best result for the substrate under Project conditions.

3.3 INSTALLATION

A. Install in conformance with manufacturer's written instructions.

B. Coordinate installation with substrates, air and vapor retarders, roof insulation, roofing membrane, and flashing to ensure that each element of Work performs properly, and that finished installation is weather tight.

1. Install flashing to produce weatherproof seal with curb and overlap with roofing system termination at top of curb.

2. Provide thermal isolation when components penetrate or disrupt building insulation. Pack fibrous insulation in rough opening to maintain continuity of thermal barriers.

3. Coordinate attachment and seal of perimeter air and vapor barrier material.

C. Where metal surfaces of tubular unit skylights shall contact incompatible metal or corrosive substrates, including preservative-treated wood, provide permanent separation as recommended by manufacturer

D. Align device free of warp or twist, maintain dimensional tolerances.

E. Inspect installation to verify secure and proper mounting. Test each fixture to verify operation, control functions, and performance. Correct deficiencies.

## 3.4 FIELD QUALITY CONTROL

A. Provide independent testing and inspection. Inspect installation to verify secure and proper mounting.

1. Test for water leaks in conformance with AAMA 502 after installation and curing of sealants but prior to installation if interior finishes.

2. Perform test for total area of each unit skylight.

3. Notify Engineer and Contractor of any failed tests.

## 3.5 CLEANING

A. Clean exposed surfaces in conformance with manufacturer's written instructions. Touch up damaged metal coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

## 3.6 PROTECTION

A. Protect installed products until completion of Project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Finish door hardware

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items that requires door hardware.

1.4 GENERAL REQUIREMENTS

A. Packaging, Marking, Delivery: Individually package each specified unit with proper fasteners and appurtenances, properly identified as to contents and location on Project Site.

B. Codes: Hardware shall comply with applicable fire, disabled access, and building codes.

C. Checking:

1. Check kinds of quantities of delivered hardware to determine conditions, completeness, and conformance to Specifications, and arrange for replacements or correction of shortages or errors.

2. Check door thicknesses, details of trims, clearances of hinges, strikes, closers, fasteners, and fire rating requirements before preparing Hardware List.

D. Storage: Store in safe place to prevent loss or damage until installation.

1.5 SUBMITTALS

A. Manufacturer's List: Submit to Engineer for review copies of "Manufacturer's List" prior to ordering of materials, as per following format:

| MANUFACTURER'S LIST | | |
|---|---|---|
| | | |
| A. | Door Butts | Manufacturer's Name |
| B. | Locksets | Manufacturer's Name |
| C. | Latchsets | Manufacturer's Name |
| D. | Etc. | Manufacturer's Name |

B. Hardware List: Submit to Engineer for review copies of Hardware List prior to ordering of materials, as per following sample format:

| HEADING 1 |
|---|
| |
| Door 1 Exterior from Corridor 3'-0" x 7'-0" x 1 3/7" (Quantity and Description) (Size) (Finish) (Mfr.) |

C. Samples: Submit to Engineer for approval, as directed by Engineer.

D. Submit exterior door keys, Master keys, and Grand Master keys to Engineer.

PART 2 - PRODUCTS

2.1 TYPES

A. Locks and Latches:

1. Locks and Latches shall be 6-pins cylindrical construction type with stainless steel mechanism for exterior doors. Provide mortise type locks where indicated on the schedule.

2. Design: "Schlage" mortise type, lever operated, 6-pins, 000 000 bitted "E" keyway. Provide 3 keys for each lock.

3. Exterior doors to have non-removable pins.

B. Lock Uniformity: Except as otherwise specified, furnish locksets, latches, cylinders, and component parts as hereinbefore specified, by 1 manufacturer.

C. Lock Strikes: Boxed type with curved tip of sufficient length to protect trim or jamb.

D. Door Stops: Solid brass or bronze, satin chromium plated finish 26D; furnish carpet risers where needed.

E. Fasteners: Bolts, screws, fittings, and other fasteners, including soffit plates for door closers to be provided for proper and secure attachments with specified hardware.

F. Door Closers: Full rack and pinion type with adjustable means of regulating closing speed, latching speed, back check, and spring power.

G. Door Holders: Solid brass or bronze material. Where wall type is not permissible, use floor type furnished with strikes of suitable height to compensate for clearance between door and floor.

H. Silencers: Provide for metal doors frames: 3 for single doors; 2 for pairs of doors.

I. Push and Pull Plates: 18-gage stainless steel with edges beveled on 4 sides. Cut plates for cylinders or thumb turn, where required.

J. Kickplates: 18-gage stainless steel, for single doors shall be 10 inches high by 1 inch less door width.

K. Thresholds: Extruded aluminum unless otherwise noted.

L. Door Butts: To be of proper width to clear trim and other features when door swings to 180 degrees.

1. Door 1-3/4-inches thick up to 7'-6" shall have 1-1/2 pair of 4-1/2 inch by 6-inch butts.

2. Doors over 7 feet 6 inches high shall have 2 pairs of butts.

3. Exterior doors to have non-removable pins.

M. Signs such as "Doors shall remain unlocked during business hours", or other signage as required by Building Code.

N. Temporary cylinders: Provide temporary cylinders throughout the buildings (quantity as necessary) to maintain security within the buildings during extent of Contract.

O. Lock Astragal: Cast bronze, for 1 3/4 inch single outswing doors, of 9 3/8 inch by 1 1/2 inch overall size with US10 finish designed for prevention of tampering of latch bolt or dead lock from the exterior and with through-bolt mounting.

2.2 HARDWARE MANUFACTURER

A. Designations in Hardware List are the catalog numbers of the following manufacturers (unless otherwise described):

1. Hinges: McKinney Manufacturing Company, Pittsburgh, Pennsylvania.
2. Locksets, Deadlatches, and Latchsets: Schlage Lock Company, San Francisco, California.
3. Door Closers: Norton.
4. Door Stops and Silencers: Quality Hardware Company, Los Angeles, California.
5. Push Plates, Door Pulls, and Kick Plates: Quality Hardware Company, Los Angeles, California.
6. Cabinet Hardware: Stanley Hardware Company.
7. Shelf Standards and Supports: Knape and Vogt, Los Angeles, California.
8. Coat and Hat Hooks: Builders Brass Works.
9. Thresholds: Pemko.
10. Sign: Builders Brass Works.
11. Kick Plates: Quality Hardware Company.
12. Door Butts: McKinney.
13. Drawer Slides: Knape and Vogt.
14. Magnetic Latches: Hager.

2.3 FINISHES

A. Hinges:

1. For doors to be painted: bonderize and prime for painting.
2. For doors to be natural or stain finished: shall be U.S. 26D satin finish, chrome plated.

B. Locksets and Latches: US 26 satin chromium plated.

C. Closers: Aluminum lacquer or enamel.

D. Stops: Satin chrome, U.S. 26D.

E. Kick Plates, Push, and Pulls: U.S. 32D stainless steel finish.

2.4 KEYING

A. Locks shall be Grand Master keyed and charted by the lock manufacturer at the factory.

B. Locks shall be keyed as directed by Engineer after award of Contract.

C. Label locks and cylinders consecutively with door number to correspond with change keys. Shipping tags shall be approximately 2 inches by 3 inches in size.

D. Master key cabinet locks on separate system as directed by Engineer.

E. Keys:

1. Nickel-silver, 7/8 bow, plain both sides, stamped "City of Los Angeles- DO NOT DUPLICATE".

2. Furnish 10 keys for keyed alike locks (exterior door keys), 2 keys each keyed different locks, 6 master keys, and 6 grand master keys.

3. Keys shall be properly identified as to project name and key locations.

4. Keys for interior locker and cabinets to be keyed on a master system, 2 keys each. Provide 6 master keys.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install hardware accurately and securely, in conformance with best practice of the trade.

B. Hardware shall be removed, repackaged, and identified for reinstallation prior to painting.

C. Reinstall hardware permanently upon completion of painting.

D. Attachments:

1. In conformance with best practice and manufacturer's written instructions.

2. Install screws and bolts perpendicular to face of member.

3. Secure hardware tightly to framing or blocking.

E. Operations:

1. Set strikes to preclude rattling or movement of closed latched doors.

2. Hardware shall operate smoothly, easily, and properly without bind.

F. Hardware Locations on Doors and Frames:

1. Top of Top Hinge: 5-inches below top of door frame opening.

2. Bottom of Bottom Hinges: 10-inches above floor.

3. Intermediate Hinges: Equidistant between top and bottom hinges.

4. Knobs and Levers of locksets and latchsets: Knob centerlines to be 38-inches from floor or unless noted on Hardware list.

5. Push and Pull Plates: Minimum 48-inches to centerline from floor.

6. Push and Pull Bars: 40 inches to centerline from floor.

7. Deadlocks: Minimum 43-inches to centerline from floor if located above a lockset; otherwise shall be 38-inches to centerline from floor.

G. Hinges for Cabinet Doors: Located symmetrically at suitable locations for proper hanging of doors.

H. Door Closers: To be attached to frame where practicable, but to soffits of doorway heads by means of suitable soffit plates furnished with the closers where attachment to frame is not practicable.

I. Fastenings: Furnish hardware with bolts, screws, or other fittings and fastenings, including soffit plates for door closers where necessary for secure attachment as required for proper attachment.

3.2 FINISH HARDWARE SCHEDULE

A. Refer to door schedule on Drawings for hardware set assignments.

HDW Set: 423

| | | | | | |
|---|---|---|---|---|---|
| 1 | EA | Continuous Hinge | 224XY W/ Torx Head Screws | 628 | IVE |
| 1 | EA | Privacy Lockset W/IND | L9496L L283-722 06A | 626 | SCH |
| 1 | EA | IC Cylinder | 6 Pin Large Format 59A1 Keyway | 626 | C-R |
| 1 | EA | Closer | 4040XP S-Cush | 689 | LCN |
| 1 | EA | Kick Plate | 8400 10" X 2" LDW | 630 | IVE |
| 1 | EA | Perimeter Seals | 328AA Head and Jambs | AL | ZER |
| 1 | EA | Auto Door Bottom | 355A | AL | ZER |
| 1 | EA | Threshold | As shown on Drawings | AL | ZER |

HDW Set: 425

| | | | | | |
|---|---|---|---|---|---|
| 1 | EA | Continuous Hinge | 224XY W/ Torx Head Screws | 628 | IVE |
| 1 | EA | Privacy Lockset W/IND | L9496L L283-722 06A | 626 | SCH |
| 1 | EA | IC Cylinder | 6PIN Large Format 59A1 Keyway | 626 | C-R |
| 1 | EA | Closer | 4040XP | 689 | LCN |
| 1 | EA | Kick Plate | 8400 10" X 2" LDW | 630 | IVE |
| 1 | EA | Dome Stop | FS436/438 As required | 626 | IVE |
| 1 | EA | Perimeter Seals | 328AA Head and Jambs | AL | ZER |
| 1 | EA | Auto Door Bottom | 355A | AL | ZER |
| 1 | EA | Threshold | As shown on Drawings | AL | ZER |

HDW Set: 453

| | | | | | |
|---|---|---|---|---|---|
| 1 | EA | Continuous Hinge | 224XY W/ Torx Head Screws | 628 | IVE |
| 1 | EA | Storeroom Lock | L9480L 06A | 626 | SCH |
| 1 | EA | IC Cylinder | 6 PIN Large Format 59A1 Keyway | 626 | C-R |
| 1 | EA | Closer | 4040XP S-Cush | 689 | LCN |
| 1 | EA | Kick Plate | 8400 10" X 2" LDW | 630 | IVE |
| 1 | EA | Perimeter Seals | 328AA Head and Jambs | AL | ZER |
| 1 | EA | Auto Door Bottom | 355A | AL | ZER |
| 1 | EA | Threshold | As shown on Drawings | AL | ZER |

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Lightgage metal framing, including backing plates and bracing

## 1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires non-structural metal framing.

## 1.4 REFERENCES

A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.

D. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

E. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

F. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members.

G. AWS D1.1/D1.1M - Structural Welding Code - Steel.

## 1.5 QUALITY ASSURANCE

A. Welders shall be qualified in conformance with requirements of AWS D1.1/D1.1M, and City of Los Angeles Department of Building and Safety certified.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Non-structural studs (at interior walls and partitions) shall be per ASTM C645, 20 gage (0.037 inch) minimum, spaced at 24 inches on center, unless otherwise indicated on Drawings, and as follows:

1. For a 5 pounds per square foot load applied perpendicular to partition or furring, the deflection shall not exceed 1/240 of the height for the stud size and spacing, and gypsum board shown.

2. Studs shall have a minimum flange width of 1/2 inch except that when studs are supporting gypsum board, flange width shall be 1 3/8 inches minimum.

3. Studs for support of ceramic tile finish, plaster finish, and locations so noted shall have a maximum deflection of L/360.

4. At door jambs 8 feet high and greater, provide double 16 gage studs from floor to structure above.

5. If governing codes do not allow stud size for span shown, stud size shall remain but stud gage and stud spacing shall be changed as required to meet codes.

B. Structural studs (at exterior walls and where indicated): "C" studs, 16 gauge minimum, complying with ASTM C955, by Western or Angeles Metal Systems (AMS), in spacing as indicated on Drawings.

C. Top and bottom runners and bridging shall be as recommended by stud manufacturer for each stud type. Top runners, where structural deflection is anticipated, shall be "deep track" type.

D. Resilient channels shall be RC-1 as manufactured by USG.

E. Furring channels:

1. ASTM C645, DWC-20 as manufactured by Western or AMS.

F. Supporting metal channels for horizontal and vertical framing, bracing, and anchors shall be hot-rolled or cold-rolled steel, coated with rust-inhibitive coating.

G. Fasteners:

1. Screws shall be 3/8 inch head diameter, cadmium plated, pan head, full threaded screws; length and diameter required for each gage and shape of metal being fastened.

2. Furring channel clips shall be manufacturer's standard galvanized wire clip for attachment of gypsum board furring channel to runner channels.

3. Welding electrodes shall be as recommended by American Welding Society (AWS) for the conditions of use and the metals being welded.

4. Powder driven fasteners shall be as manufactured by Pneutec, Hilti, or Bostich.

H. Steel backing plates shall be standard mild steel, 16 gage minimum.

2.2 FINISHES

A. Framing and furring shall be galvanized.

B. Fabricate galvanized studs, runner tracks and furring from galvanized sheet steel complying with ASTM A653/A653M, G-60 coating.

C. Materials specified by weight do not include the weight of protective finishes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Erect framing systems in conformance with manufacturer's written instructions, ASTM C754, and Drawings.

1. Partitions, furring, and suspension systems shall be independently supported.

2. Erect framing in true planes to provide solid backing for finish materials.

3. Erection tolerances:

a. Walls: Maximum variation in plumb and straight for plaster Work:

1) 1/4 inch in 10 feet

2) 3/8 inch in 20 feet and entire length

b. Walls maximum variation in plumb and straight for Work specified under ANSI A108/A118/A136 and gypsum wallboard:

1) 1/8 inch in 8 feet

2) 1/4 inch in 20 feet and entire length

3) The fastening surfaces of any vertical framing of furring member shall not vary more than 1/8 inch form the plane of the faces of adjacent framing or furring members.

c. Ceilings shall be dead level for Work.

4. Remedial Work involving framing and furring necessary to achieve specified tolerances shall be done as part of Work of this Section.

5. Double studs at sides of door or window openings in walls or partitions. Triple studs at corners.

6. Joining of members not indicated to be welded shall be attached with self-drilling screws. Wire typing of framing members is not acceptable.

B. Resilient channels:

1. Attach perpendicular to framing 16 inches on center.

a. Attach walls with mounting flange down and gap between channel and stud faces up.

b. Attach ceilings with mounting flanges facing in one direction only.

2. Do not cantilever gypsum board more than 6 inches from vertical surfaces.

3. Hold back channel ends 1 inch to 3 inches from intersecting surfaces.

4. Screw attachment:

a. Use 1-1/4 inch, ASTM C954, type S screws.

b. Drive screws only through prepunched holes in channels.

c. Splice only at framing members by overlapping ends, aligning prepunched holes, and screwing through both channel flanges.

C. Soffit and ceiling suspension system:

1. Support framing from structure above.

2. Provide necessary items, including devices for attachment to overhead construction, hanger wires, main runners, splines, splicers, connecting clips, wall connectors, hold-down clips, edge moldings, and every other device required for an installation, complete in every respect.

3. Space hangers ot over 3 feet on center in the direction of the 1 1/2 inch main runner channels, and not over 4 feet on center in the direction at right angles to the main runners and within 8 inches of main runner ends and of boundary walls, or similar interruption of soffit continuity.

4. Install main runners not over 4 feet on center position, and saddle tie hangers along runners. Main runner shall not come in contact with abutting walls. Space runner channels within 6 inches of adjacent walls to support ends of the furring channels.

5. Space drywall furring channels 16 inches on center and clip or saddle tie with 2 strands of tie wire to main runners. Provide end splices by nesting channels no less than 8 inches and securely wire tie.

6. At lights and other openings interrupting main runner and furring channels, reinforce grillage with 3/4 inches cold rolled channels wire tied atop, and parallel to main runner channels.

D. Wall framing:

1. Align and anchor ceiling and floor tracks to building construction with powder-driven fasteners reviewed by Engineer, or acceptable screws to steel members, 12 inches on center for studs supporting lath and plaster.

2. Install studs in single lengths extending from floor to underside of floor or roof structure above.

3. Splices in axially loaded studs shall not be permitted.

4. For 18 gage framing components or heavier, splice or butt weld except joints in the runner track. No splices are permitted in tracks over lintels or diagonal bracing.

a. Weld connections by resistance spot or projection weld, fillet weld, or plug weld in conformance with AWS recommended procedures and practices.

b. At galvanizing, touch up field abrasions and welds with zinc-rich paint material.

5. Where tracks or studs partially contact steel beams, attach a clip angle or section of bent stud to the beam, and attach the stud with wire ties, screws, washers, and slotted holes to allow for deflection.

6. Install studs initially with a tight friction fit to tracks. Align and plumb studs.

7. Double studs adjacent to doors and openings and attach to top and bottom track either by welding or screws, and to door head tracks with clip angles. Locate additional studs not more than 2 inches from door and window frames, abutting walls or wall corners. Over door frames, place a section of track with a clip angle at each end horizontally, and attach securely to the adjacent vertical studs. Install cut-to-length studs at the location of vertical joints, and at standard spacing over the door frame header extending to the ceiling track. Provide 3 studs minimum at corner of stud walls.

8. When walls abut steel columns, or other structural elements, install the stud 2 inches away or as indicated on Drawings from said material, and extend the horizontal stiffeners and attach it to the structural element.

9. Place studs so that their flanges point in the same direction.

10. Lateral bracing of studs shall be provided at lateral bracing and bridging in conformance with manufacturer's written instructions and as indicated, installed in the "punch outs" of their studs. Channels shall be in longest possible lengths, lapped 12 inches and wire tied or welded at joints.

11. Provide 1 1/2 inch channel horizontal stiffener at not more than 5 feet on center in wall to receive plaster, and in each side of staggered and double row partitions. Weld stiffeners to each stud.

12. Provide additional 3/4 inch channel horizontal stiffener 6 inches above door head and extend 2 stud spaces beyond jamb studs.

13. Space studs as indicated, but do not exceed 16 inches on center for support of plaster.

E. In tunnel corridor construction, install studs securely with powder-driven fasteners reviewed by Engineer, or acceptable screws to structure. Install in single lengths, level, plumb, and as indicated on Drawings.

F. Where indicated or required, perform welding in conformance with AWS D1.1/D1.1M.

G. Stop studs short (for structural deflection) of overhead structure where partitions are required to go to that level. Submit detail of proposed method, using "deep track" runners.

H. Do not place splices or reinforcing on outside faces of studs; use inside splices and reinforcing.

3.2 BACKING PLATES

A. Provide steel backing plates in connection with steel studs and channel furring necessary for engaging and fastening Work of other trades in locations indicated or necessary, except for backing plates, counter supports, or fixture carriers specified to be provided under other Sections.

B. Weld or bolt rigidly to studs as indicated on Drawings and shown on approved shop drawings. Plates shall not be lighter than 16 gage by 4 inches wide, and of such lengths as to span a minimum of 3 studs. Weld plates at top and bottom of each stud crossing.

C. Coordinate precise locations with related trades.

D. Paint bare surfaces of plates and welds with metal primer after installation.

3.3 ANCHORING DOOR FRAMES

A. Bolt, screw, or weld frames to supporting studs. Provide a 36 inch long, 3/4 inch furring channel wire-tied to studs at hinge and strike locations, and projected into door frame.

B. Studs framing door openings shall be clipped to the floor with 14 gage angle clip with 2 fasteners in stud and 2 fasteners into floor.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Mortar beds and render mortar materials

B. Grout materials

1.2 RELATED SECTIONS

A. Section 04 22 00 - Concrete Unit Masonry

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires tile and stone setting materials and accessories.

1.4 REFERENCES

A. ANSI A108.01 - General Requirements: Subsurfaces and Preparations by Other Trades.

B. ANSI A108.02 - General Requirements: Materials, Environmental, and Workmanship.

C. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework.

D. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar.

E. ANSI A108.20 - American National Standard Specifications for Exterior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs.

F. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.

G. ANSI A136.1 - American National Standard Specifications for Organic Adhesives for Installation of Ceramic Tile.

H. ANSI A137.1 - American National Standard Specifications for Ceramic Tile.

I. ANSI A137.2 - American National Standard Specifications for Glass Tile.

J. ANSI A137.3 - American National Standard Specifications for Gauged Porcelain Tile and Gauged Porcelain Tile Panels/Slabs.

K. ISO 13007-2 - Ceramic Tiles - Grouts and Adhesives - Part 2: Test Methods for Adhesives.

L. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation.

1.5 SUBMITTALS

A. Product Data: Manufacturer's technical information for each product specified.

B. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.

C. Samples: Color charts for selection of grout.

D. Manufacturer's Certificates: Certify that products meet or exceed specified requirements.

1. When applicable, submit a Master Grade Certificate signed by the manufacturer and the installer certifying that products meet or exceed the specified requirements of ANSI A137.1, ANSI A137.2 and/or ANSI A137.3.

E. Installation Instructions: Manufacturer's written printed instructions for each product.

F. Maintenance Data: Include recommended cleaning methods, cleaning materials, and maintenance coatings.

1.6 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: MAPEI Corporation, www.mapei.us.

1. Email: TechServiceRequests@mapei.com.

2.2 MATERIALS

A. Organic Adhesive: Wall tile adhesive, nonflammable in conformance with ANSI A136.1 and ISO 13007-2.

1. Product: MAPEI, Type 1.

B. Premium Epoxy Mortar and Grout: For grout joints from 1/16 inch to 3/8 inch, in conformance with ANSI A118.3 and ISO 13007-2.

1. Product: MAPEI, Kerapoxy CQ.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for conditions affecting performance of Work. Refer to ANSI A108.01, ANSI A108.02, and if applicable ANSI A108.19 and/or ANSI A108.20.

3.2 INSTALLATION

A. Apply tile and grout cleaners, sealers, and maintenance products in conformance with manufacturer's written printed instructions and technical data sheets.

3.3 GROUTING

A. Grout joints in conformance with manufacturer's written instructions and ANSI A108.10.

B. Remove standing water, dust, and foreign substances from joints to be grouted.

C. Clean and dry tile surfaces.

D. Apply grout to concrete masonry unit (CMU) joints with a grout bag.

E. After grouting, remove grout residue promptly.

## 3.4 PROTECTION

A. Walls: Protect from impact, vibration, and heavy hammering on adjacent and opposite walls for at least 14 days after installation, unless manufacturer's written instructions allow a shorter period.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Resilient flooring, including but not limited to the following:

1. Preparatory Work
2. Vinyl composition floor tile
3. Sheet vinyl
4. Rubber tile flooring
5. Rubber stair treads and risers
6. Topset base

## 1.2 RELATED SECTIONS

A. Section 07 92 00 - Joint Sealants

B. Section 32 13 14 - Concrete for Exterior Improvements

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires resilient flooring.

## 1.4 REFERENCES

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.

C. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.

## 1.5 SUBMITTALS

A. Samples: Submit 3 samples each, of each flooring material 3 inches square and 2 linear inches of base and stair tread nosing materials.

B. Installation Procedures: Submit 3 current copies of flooring manufacturer's recommended standard installation procedure for each type of flooring material.

C. Provide 3 copies of manufacturer's product data and test reports demonstrating material compliance with Specifications.

D. Provide 3 copies of selected manufacturer's products and materials referenced to Drawings Finish Schedule for final approvals.

E. Preventative Maintenance and Inspection: Upon completion, but prior to acceptance of Work, submit in triplicate current copies of flooring manufacturer's written instructions for maintenance methods and products for each type of flooring material.

1.6 QUALITY CONTROL

A. Materials used for walking surfaces shall be tested for a minimum slip resistance (friction) coefficient of 0.60 or higher. Manufacturers' supporting data may be used in lieu of testing, as approved by Engineer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project Site in manufacturer's original, unopened containers with brands, names, and production runs clearly marked thereon. Handle materials carefully and store them in their original containers at no less than 65 degrees Fahrenheit (F) for at least 48 hours prior to starting Work.

1.8 ENVIRONMENTAL CONDITIONS

A. Maintain the temperature of spaces in which flooring Work is to be performed at no less than 65 degrees F or as recommended by flooring manufacturer at the floor level for at least 48 hours after Work is completed. Maintain a minimum temperature of 55 degrees F thereafter. Provide adequate ventilation to remove moisture and fumes from the area.

1.9 EXTRA STOCK

A. Upon completion of Work, deliver to Engineer additional flooring and base for use in repairs and maintenance. Additional materials of each color shall be from the same production run as the materials installed. Furnish the tile and base in their original boxes, properly marked, in the following quantities and with the colors in the same proportions as the installed materials:

1. Vinyl Composition Tile: 2 percent of quantity installed.
2. Wall Base: 2 percent of quantity installed.
3. Rubber Tile: 2 percent of quantity installed.
4. Sheet Vinyl: 2 percent of quantity installed.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Vinyl composition tile and sheet vinyl:

1. Color and Pattern: The color and pattern, as indicated on drawings, of the tile shall be uniformly distributed throughout the thickness of the tile. Resilient flooring materials of the same type, pattern and color shall be of the same production run and shall be so marked. Variations in shades and off-pattern matches between containers are not acceptable. Flooring in a continuous area or replacement of damaged flooring in a continuous area shall be from the same production run and shall have the same shade and pattern.
2. Technical Data:
   a. Fire Resistance: Maximum flame spread rating of less than 75 when tested in conformance with ASTM E84 Tunnel Test, and more than 1.0 when tested under ASTM E648 Flooring Radiant Panel Test.
   b. Slip Resistance: Friction coefficient of 0.60 or higher.
   c. Chemical Resistance: Materials shall be dimensionally stable and highly resistant to a number of reagents chemicals and stains. Consult with Engineer for a list of applicable chemicals and provide supporting manufacturer's testing data for approval prior to execution.
3. Vinyl Composition Tile: 12 inch by 12 inch by 1/8 inch thick with square and true edges, ASTM F1066, Type IV, Composition 1.
4. Sheet Vinyl: 0.80 inch thick or 0.120 inch thick.
5. Physical characteristics and technical properties of items specified or indicated on Drawings are intended as the building standard.

B. Rubber Studded Sheet Flooring: Provide material that is homogeneously constructed of first quality, virgin materials, with color extending throughout the thickness. Material shall be free of objectionable odors, blisters, cracks or other imperfections which detract from serviceability or appearance. Tiles shall have sanded backs to assure proper adhesion. Colors and pattern design as indicated on Drawings. Products as manufactured by Afco Rubber Company, Allstate Rubber Corporation, Endura, Flexco, Johnsonite, or Roppe. Allstate Rubber Corp. (818) 793-9840.

C. Rubber Studded Treads and Risers: Provide heavy duty, one piece nosing treads and riser panels. Treads are to be 1/4 inch thick, tapered to 5/32 inch, in standard lengths and widths as needed. Materials must conform to requirements stated above. Nosings (square or rounded) as selected by Engineer. Provide integrated, recessed alternate colored safety strip at top and bottom landings. Products as manufactured by companies listed for rubber studded sheet flooring.

D. Wall Base: Rubber wall base shall be Johnsonite straight and cove type; 4 inches high, color as indicated on Drawings. Use a flexible base to conform to irregularities in the walls, partitions and floors. Provide premolded corners in matching size, shape and color for right angle inside and outside corners.

E. Underlayment: Latex type, as recommended by flooring manufacturer.

F. Adhesives: Adhesive as recommended by flooring manufacturer.

## PART 3 - EXECUTION

### 3.1 CONDITION OF THE SURFACES

A. Surfaces that are to receive flooring shall be clean, dry, smooth, firm, sound and free of oil, paint, wax, dirt or other damaging materials.

B. Preparation of concrete floor surfaces: Grind ridges and other uneven surfaces smooth. Concrete curing compounds, other than the types that do not adversely affect adhesive, shall be removed entirely from the slabs. Cut out and fill cracks 1/16 inch wide and wider with a crack filler specified for this application. Provide a latex underlayment to fill the remaining holes, cracks and depressions and for smoothing, leveling and feather-edging the concrete. Remove loose particles. Vacuum chalky, dusty surfaces. Prime the cleaned surfaces, or as recommended by flooring manufacturer.

C. Moisture Test for Concrete Floors: As recommended by floor covering manufacturer.

## 3.2 INSTALLATION

A. To avoid damaging the finished floor, install flooring after other trades in the same area have been completed. Apply the flooring and the accessories in conformance with manufacturer's installation procedure. Work shall be performed by workers experienced in the application of such flooring. Detailed requirements are as follows:

1. Adhesives: Apply adhesives per the adhesive manufacturer's printed directions. Comply with recommended trowel notching, spread rates, and open times. Smoking or use of open flames or other immediate sources of ignition is strictly prohibited in the area where solvent-containing adhesives are being used or spread.. Post conspicuous signs reading "NO SMOKING OR OPEN FLAME" in the area of the spread adhesive.

2. Flooring:

   a. Apply tile flooring in the patterns indicated. Start in the center of the room or area and work from the center towards the edges. Keep the tile lines and joints square, symmetrical, tight and even and keep each floor in a true, level plane, except where indicated as being sloped. Vary the width of edge tiles as necessary to maintain full-size tiles in the field, but no edge tile shall be less than one-half the filed tile size, except where irregular-shaped rooms make it impossible.

   b. Lay sheet vinyl flooring material with a minimum number of seams consistent with prudent use of material. Avoid cross seams. Provide integral flash coves supported by a reinforcing fillet strip and capping.

3. Cutting: Cut flooring to fit around permanent fixtures, built-in furniture and pipes and outlets. Cut flooring edges, fit the flooring and scribe the flooring to the walls and partitions after the tiled flooring has been applied.

B. Application of Rubber Wall Base: Apply wall base after the flooring has been completed and the wall surface to which the base is to be applied is dry. Form inside and outside corners with base materials, as specified herein.

1. Surface Preparation: Fill cracks and voids in the wall with a crack filler specified for this application. Bring irregular surfaces to a smooth finish with a smoothing compound.

2. Wall Base: Apply base adhesive to the back of the base with a notched trowel, leaving approximately 1/4 inch bare space along the top edge of the base. Immediately press the base firmly against the wall and move the base gently into place, making sure that the toe is in contact with the floor surface and the wall. Roll the entire vertical surface of the base with a hand roller and press the toe of the base with a straight piece of wood to ensure proper alignment.

C. Application of Rubber Stair Treads: Use adhesive as recommended by the selected manufacturer. Coordinate installation with other trades, i.e. installation of railings, painting.

## 3.3 CLEANING AND FINISHING

A. Cleaning: Upon completion of the installation, follow the flooring manufacturer's written instructions to remove excess adhesive and clean the flooring and adjacent surfaces. Five days after installing the flooring, wash the flooring with the flooring manufacturer's recommended cleaning solution. Rinse the flooring thoroughly with cool, clean water, while avoiding flooding the floor.

B. Finishing: Clean the floor by damp mopping. Do not buff the finish. Refer to manufacturer's procedures.

## 3.4 PROTECTION

A. Protect flooring from traffic for a period of 48 hours after installation to allow adhesive to properly set. From the time of laying the floor until its acceptance, protect the floor from damage. Remove and replace defects which develop, such as damaged, loose, broken or curled tiles prior to the final inspection.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Exterior paint for:

1. Above ground water distribution systems
2. High mast poles
3. Metal fabrications
4. Guard posts
5. Timber bullrails
6. Electrical backboards
7. Other elements shown on Drawings or listed in Specifications to receive painting or coating

B. For Work shown on Drawing No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

## 1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

B. Section 33 10 01 - Water Distribution

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires painting for exterior improvements.

## 1.4 REFERENCES

A. 29 CFR 1910.134 - Respiratory protection.

B. 29 CFR 1910.1000 - Air Contaminants.

C. SSPC PA Guide 10 - Guide to Safety and Health Requirements for Industrial Painting Projects.

D. SSPC-SP 6 - Commercial Blast Cleaning.

E. Reference Specifications (RS):

Subsection 210-1 - Paint

1.5 SUBMITTALS

A. Samples of Painting:

1. Color swatches 8 1/2 inches by 11 inches shall be required for each type of paint material and color. Submit swatches to Engineer for approval not less than 10 days prior to start of painting.

B. Extra Stock Materials:

1. Provide two 1-gallon paint, in original and sealed containers bearing manufacturer's label, for each type and color used for finish coats. Identify each container by color and type.

1.6 QUALITY ASSURANCE

A. Paint products and applications shall comply with South Coast Air Quality Management District (SCAQMD) regulations. The product label and/or Safety Data Sheet (SDS) shall state that the product meets requirements or manufacturer shall furnish certificate of compliance.

1.7 ENVIRONMENTAL AND HEALTH REQUIREMENTS

A. Coating Hazards:

1. Comply with the requirements of SSPC PA Guide 10.

2. Specified coatings may have potential health hazards if ingested or improperly handled. The coating manufacturer's written safety precautions shall be followed throughout mixing, applying, and curing of the coatings. During cleaning, cleanup, surface preparation, and coating application phases, ensure that employees are protected from toxic and hazardous chemical agents which exceed concentrations in 29 CFR 1910.1000. Comply with respiratory protection requirements as required in 29 CFR 1910.134 .

3. Take care to prevent fire; open containers or inflammable materials only as needed; keep rubbing cloths and oily rags in tightly closed metal container, or remove from Project Site daily. Benzene, gasoline, and distillate shall not be permitted on Project Site.

4. Do not apply coatings in unheated space during foggy or rainy weather, or under the following surface temperature conditions:

    a. Less than 5 degrees Fahrenheit (F) (4 degrees Celsius (C)) above the dew point; and

    b. Below 40 degrees F (4 degrees C) for oil based paints, 10 degrees F (50 degrees C) for latex paints or over 95 degrees F (35 degrees C), unless approved in writing by manufacturer's representative and quality control manager.

    c. Below 32 degrees F (0 degrees C) or over 120 degrees F (49 degrees C), unless approved in writing by manufacturer's representative and quality control manager.

5. Paints shall comply with City of Los Angeles Green Building Code requirements.

    a. Enter pertinent product data in VOC Content Verification Checklist form and provide product specification sheets. Make checklist and specifications available to City of Los Angeles Department of Building and Safety inspector through Engineer upon request. VOC Content Verification Checklist can be found here: https://ladbs.org/docs/default-source/forms/green-building-2023/grn_2_voc_content_verification_checklist-01.17.23.pdf?sfvrsn=19f4c153_10

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver in factory sealed containers with labels intact, in conformance with RS Subsection 210-1.

B. Store in conformance with manufacturer's written instructions for paint shelf life, including, but not limited to, protection from temperature extremes.

C. Obtain Engineer's approval of materials before containers are opened.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Paint products used in the coating systems shall be from the same manufacturer.

B. Paints shall comply with City of Los Angeles Green Building Code requirements.

C. The products listed are to be produced and supplied by Dunn-Edwards Paints.

1. Ungalvanized Ferrous Metals:

| | |
|---|---|
| First Coat | BRPROO Bloc-Rust Primer |
| | |
| Second Coat | EVSH60 Evershield Gloss Enamel |
| | |
| Third Coat | EVSH60 Evershield Gloss Enamel |

2. Galvanized Metals:

| | |
|---|---|
| Pretreatment | Metal Clean & Etch by Krud Kutter/ Rust-Oleum |
| | |
| First Coat | ULGM00-WH Ultrashield Galvanized Metal Primer |
| | |
| Second Coat | EVSH60 Evershield Gloss Enamel |
| | |
| Third Coat | EVSH60 Evershield Gloss Enamel |

3. Wood:

| | |
|---|---|
| First Coat | EZPR00 EZ-Prime Premium |
| | |
| Second Coat | EVSH50 Evershield Semi-Gloss |
| | |
| Third Coat | EVSH50 Evershield Semi-Gloss |

4. Concrete:

| | |
|---|---|
| First Coat | ESSL00 EFF-STOP Select |
| | |
| Second Coat | ACHS10 ACRI-HUES Exterior Acrylic Flat |
| | |
| Third Coat | ACHS10 ACRI-HUES Exterior Acrylic Flat |

## PART 3 - EXECUTION

### 3.1 SURFACE PREPARATION-UNGALVANIZED METALS

A. Clean surfaces to be painted by No. 6 Commercial Blast Cleaning in conformance with SSPC-SP 6.

### 3.2 SURFACE PREPARATION-GALVANIZED METALS

A. Clean galvanized metals in conformance with written instructions of pretreatment wash manufacturer, then apply pretreatment wash.

B. Blast lightly with fine abrasive or organic media (walnut shells) at 45 degree angle (profile only, do not remove zinc coating).

### 3.3 APPLICATION

A. Surfaces to be painted shall be approved by Engineer prior to painting.

B. Do not use paints with coarse particles, skins, and indications of color instability.

C. Protect surfaces not designated to receive paint.

D. Apply paint in uniform thickness and Work into joints in conformance with manufacturer's written instructions.

E. Surfaces shall be dry during painting. No painting shall be done in damp weather unless surfaces to be painted are kept dry.

F. Paint shall be dry before applying succeeding coats.

G. Color schedule (if any) shall be in accordance with Drawings and applicable Specification Sections and shall be approved by Engineer prior to painting.

1. Refer to WATER DISTRIBUTION, and ELECTRICAL BACKBOARD Sections for color selections for those improvements.

H. Paint showing signs of blistering, spotting, uneven coating, or sagging shall be rejected.

I. Steel items that are to be encased or partially encased in concrete shall be painted with complete coating system before being encased.

J. Do not apply second and third coats until previous coat has been approved by Engineer.

K. Electrical panels shall be touched-up in conformance with manufacturer's written instructions to match original color and type of paint.

3.4 COATING THICKNESSES

A. First Coat: (Prime coat): 1.5 to 2.5 mils in dry film thickness.

B. Second Coat: 1.5 to 2.0 mils in dry film thickness.

C. Third Coat: 1.5 to 2.0 mils in dry film thickness.

3.5 CLEANING AND PROTECTION

A. Cleaning: Remove from Project Site discarded paint materials, rubbish, cans, and rags at end of each day.

B. Upon completion of painting Work, clean overspray off of adjacent surfaces. Remove overspray by proper methods of washing and scraping, taking care not to scratch or otherwise damage adjacent finished surfaces.

C. Protection: Protect Work of other trades and existing adjacent surfaces,whether to be painted or not, against damage by painting and finishing Work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Engineer.

1. Place "Wet Paint" signs as required to warn passersby of newly-painted finishes.

2. Touch-up and restore damaged or defaced painted surfaces before final inspection.

3. Remove temporary protective wrappings for protection of adjacent Work after completion of painting operations.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. High-performance coatings including coatings, coating, or coating system for the following items:

1. Steel items that are exposed to the atmosphere including structural steel beams; fabricated steel items; sheet metal fabricated items; sheet metal flashings; and other steel or sheet metal surfaces that are exposed to the atmosphere or are noted on Drawings or specified to receive high-performance coatings.

2. Structural steel.

3. Portion of structural steel embedded in concrete.

## 1.2 RELATED SECTIONS

A. Section 05 12 02 - Structural Steel

B. Section 05 50 00 - Metal Fabrications

C. Section 07 60 00 - Flashing and Sheet Metal

D. Section 08 11 13 - Hollow Metal Doors and Frames

E. Section 09 90 01 - Painting for Exterior Improvements

F. Section 32 13 14 - Concrete for Exterior Improvements

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires high-performance coatings.

## 1.4 REFERENCES

A. ASTM D6386 - Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting.

B. SSPC-SP 1 - Solvent Cleaning.

C. SSPC-SP 10 - Near-White Metal Wet Abrasive Blast Cleaning.

D. SSPC-SP 11 - Power-Tool Cleaning to Bare Metal.

1.5 SUBMITTALS

A. Product data for the coating system specified.

1. Submit the manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use in Project.

B. Certification by the manufacturer that products supplied comply with South Coast Air Quality Management District (SCAQMD) regulations controlling use of volatile organic compounds (VOCs).

C. Samples: Submit samples of each color and material to be applied with texture to simulate actual conditions on representative samples of the actual substrate.

1. Submit stepped samples, defining each separate coat. Use representative colors when preparing samples for review. Resubmit until the required sheen, color, and texture are achieved.

2. Submit a list of material and application for each coat of each sample. Label each sample as to location and application.

3. Submit samples on the following substrates for Engineer's review of color and texture only:

a. Ferrous Metal: Provide two 4-inch square samples of flat metal and two 8-inch long samples of solid metal for each color and finish.

D. Submit the name of an independent testing agency for Engineer’s approval prior to starting coating application Work.

E. Submit qualification data for coating system applicator.

1.6 QUALITY ASSURANCE

A. Manufacturer's Services: Qualified technical representative shall be available to visit Project Site for technical support as required to resolve field problems associated with substrate preparation, use, mixing, application, and curing of high-performance coating systems.

B. Applicator Qualifications: Engage an experienced applicator who has successfully completed coating system applications similar in material and extent to those indicated for Project.

C. Single-Source Responsibility: Provide primers and undercoat material produced by the same manufacturer as the finish coats for each type of coating. Use only thinners recommended by coating manufacturer and only within recommended limits.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project Site in manufacturer's original, new, unopened packages, and containers bearing manufacturer's name and label, and the following information:

1. Name or title of material.

2. Product description (generic classification or binder type).

3. Manufacturer's name, stock number, and date of manufacture.

4. Contents by volume, for major pigment and vehicle constituents.

5. Thinning instructions.

6. Application instructions.

7. Color name and number.

8. Handling instructions and precautions and material safety data sheets.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 degrees Fahrenheit (F). Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and Work areas are protected from fire and health hazards resulting from handling, mixing, and supplying the coatings.

1.8 PROJECT SITE CONDITIONS

A. Apply coatings only when the temperature of surfaces to be coated and surrounding air temperatures are between 45 degrees F and 85 degrees F or as specified in coating manufacturer’s written instructions.

B. Do not apply coatings in rain, fog or mist; when the relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.

1. Allow wet surfaces to dry thoroughly and attain the temperature and conditions specified before proceeding with or continuing the coating operation.

2. Work may continue during inclement weather only if areas and surfaces to be coated are enclosed and the temperature within the area can be maintained within limits specified by the manufacturer during application and drying periods.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. General:

1. Material Compatibility: Provide primers, finish coat material, and related materials that are compatible with one another and the substrates indicated under conditions of service and application as demonstrated by manufacturer based on testing and field experience.

2. Material Quality: Provide the highest grade of the various coatings as regularly manufactured by acceptable coating manufacturers. Materials not displaying manufacturer's identification as a best grade product will not be acceptable.

3. Colors: Provide color selections as noted on Drawings.

B. Coating system shall be from 1 manufacturer.

### 2.2 COATING SYSTEM

A. Zinc rich/epoxy/polyurethane coating system as manufactured by Tnemec Company, Incorporated (Tnemec):

1. First Coat (Primer): Series 90-97 Tneme-Zinc aromatic urethane, zinc at 2.5 to 3.5 mils dry film thickness (DFT) or Series 94-H2O Hydro-Zinc at 2.5 to 3.5 mils DFT.

2. Touch Up: Series 90-97 Tneme-Zinc at 2.5 to 3.5 mils DFT or Series 94-H2O Hydro-Zinc at 2.5 to 3.5 mils DFT.

3. Second Coat: Series L69 Hi-Build Epoxoline II polyamidoamine epoxy at 2.0 to 4.0 mils DFT.

4. Third Coat: Series 1095 Endura-Shield aliphatic acrylic polyurethane at 2.0 to 3.0 mils DFT.

B. Zinc / epoxy / polyurethane system as manufactured by Carboline:

1. First Coat (Primer): Carbozinc 859 organic zinc rich epoxy at 3.0 to 5.0 mils DFT or Carbozinc 11 WB water based self-curing inorganic zinc at 3.0 to 4.0 mils DFT.

2. Touch Up: Carbozinc 859 at 3.0 to 3.5 mils DFT or Carbozinc 11 WB at 3.0 to 4.0 mils DFT.

3. Second Coat: Carboguard 890 VOC cycloaliphatic amine epoxy 4.0 to 6.0 mils DFT.

4. Third Coat: Carbothane 133 MC aliphatic acrylic polyurethane satin finish 3.0 to 5.0 mils DFT.

## 2.3 COATING FOR EMBEDDED STEEL

A. Structural steel embedded in concrete shall be coated with high-solids epoxy, Tnemec Series L69 Hi-Build Epoxoline II at 4.0 to 6.0 mils DFT or Carboguard 890 VOC at 6.0 to 8.0 mils DFT.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine substrates and conditions under which coatings will be applied for compliance with manufacturer’s written application requirements. Surfaces to receive coatings shall be thoroughly dry before coatings are applied.

1. Do not proceed with coating application until unsatisfactory conditions have been corrected.

2. Start of application shall be construed as Contractor's acceptance of surfaces within that particular area.

B. Review sections in which coatings are provided to ensure compatibility of the total systems for various substrates. On request, furnish information on the characteristics of specified finish materials to ensure compatible primers.

1. Notify Engineer of problems anticipated using the coatings specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures and similar items already in place that are not to be coated, or provide surface-applied protection prior to surface preparation and coating. Remove these items, if necessary, to completely coat the items and adjacent surfaces. Following the coating operations in each space or area, have removed items reinstalled by workers skilled in the trades involved.

B. Cleaning: Before applying coatings or other surface treatment, clean the substrates of substances that could impair bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and coating application so dust and other contaminants from the cleaning process will not fall on wet, newly coated surfaces.

C. Surface Preparation:

1. General: Clean and prepare surfaces to be coated in conformance with manufacturer's written instructions for each particular substrate condition and as specified.

a. Provide barrier coats over incompatible primers, or remove and reprime. Notify Engineer in writing of problems anticipated when using the specified finish-coat material with substrates primed by others.

2. Ferrous Metal: Clean ungalvanized ferrous metal surfaces that have not been shop-coated; remove oil, grease, dirt, loose mill scale and other foreign substances. Use solvent or mechanical cleaning methods as recommended by manufacturer of high-performance coating system. Clean in conformance with SSPC-SP 10 with a minimum 2 mils angular anchor profile.

a. Touch up shop-applied prime coats that have been damaged and bare areas. Clean in conformance with SSPC-SP 11 with a minimum 1.5 mils angular anchor profile, and touch up with the same primer as the shop coat.

3. Galvanized Surfaces: Clean surfaces in conformance with SSPC-SP 1 to remove soluble contaminants. Uniformly roughen entire surface by either abrasive blast or mechanical etch to achieve a uniform anchor profile (1.0 to 2.0 mils) in conformance with ASTM D6386, Section 5.4.1.

4. Nonferrous Metal Surfaces: Clean nonferrous surfaces in conformance with manufacturer's written instructions for the type of service, metal substrate, and application required.

D. Material Preparation:

1. Carefully mix and prepare materials in conformance with coating manufacturer's written instructions.

2. Maintain containers used in mixing and application of coatings in conformance with manufacturer's written instructions.

3. Stir materials before applying to produce a mixture of uniform density; stir as required during application. Do not stir surface film into the material. Remove film and if necessary, strain the coating material before using.

4. Use only the type of thinners approved by the manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to facilitate identifying each coat where multiple coats of the same material are to be applied. Tint undercoats to match the color of the finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply high-performance coating system in conformance with the coating manufacturer's written instructions. Equipment shall be in conformance with coating manufacturer’s written instructions.

1. Do not apply coatings over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to forming a durable coating film.

2. Coating colors, surface treatments, and finishes shall be as indicated on Drawings.

3. Provide finish coats compatible with the primers used.

4. The number of coats and film thickness required shall be the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by coating manufacturer. Where sanding is required, conforming to manufacturer's written instructions, sand between applications to produce a smooth, even surface.

5. When undercoats or other conditions show through the final coat, apply additional coats until the cured film has a uniform coating finish, color, and appearance. Give special attention to edges, corners, crevices, welds, exposed fasteners, and similar surfaces to ensure that surfaces receive a dry film thickness equivalent to that of flat surfaces.

6. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, and similar components are in place. Extend coatings in these areas to maintain the system integrity and provide desired protection.

    a. Coat surfaces behind movable equipment and furniture the same as similar exposed surfaces.

    b. Coat the back sides of access panels, removable or hinged covers, and similar exposed surfaces.

    c. Omit primer on metal surfaces that have been shop-primed and touched-up painted.

7. After erection, exposed surfaces damaged during fabrication or erection including weld seams shall be spot cleaned in conformance with SSPC-SP 11. These surfaces shall then receive a touch up coat of primer or first coat.

B. Schedule Coating: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface deterioration.

1. Allow sufficient drying time between successive coats. Do not recoat until the coating has dried so it feels firm and does not deform or feel sticky under moderate thumb pressure and where applying another coat does not cause the undercoat to lift or lose adhesion.

C. Minimum Coating Thickness: Apply each material no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as specified in Coating System Article of this Section.

D. Prime Coats: Before applying intermediate coats, apply a prime coat of material, compatible with the high-performance coating system and as recommended by coating manufacturer, to the material required to be coated or finished that has not been prime-coated by others. Touch up any damaged or defective areas of shop-applied inorganic zinc rich primer coats.

1. Recoat primed and sealed substrates where there is evidence of suction spots or unsealed areas in the first coat to ensure a finish coat with no burn-through or other defects caused by insufficient sealing.

E. Brush Application: Brush-out and work brush coats into surfaces in an even film. Eliminate cloudiness, spotting, holidays, laps, brush marks, sags, ropiness, or other surface imperfections. Neatly draw glass lines and color breaks.

1. Apply primers and first coats by brush unless manufacturer's written instructions permit using mechanical applicators.

F. Mechanical Applications: Use mechanical methods to apply coating when permitted by manufacturer's written instructions and governing regulations.

1. Wherever using spray application, apply each coat to provide the equivalent hiding of brush applied coats. Do not double-back with spray equipment building-up film thickness of 2 coats in one pass, unless recommended by manufacturer.

G. Completed Work: Match approved samples for color, texture and coverage. Finish coat(s) shall be uniform in color and sheen, without streaks, laps, sags, or missed areas. Remove, refinish, or recoat Work not complying with specified requirements.

## 3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Engineer reserves the right to request the following test procedures at any time and as often as Engineer deems necessary during coating operations:

a. Contractor shall engage and pay for the services of an independent testing agency approved by Engineer to sample the coating system being used. Samples of material delivered to Project Site shall be taken, identified, sealed, and certified in the presence of Engineer.

b. The testing agency shall perform appropriate tests for the following characteristics as required by Engineer:

1) Quantitative materials analysis.

2) Absorption.

3) Accelerated weathering.

4) Accelerated yellowness.

5) Color retention.

6) Alkali and mildew resistance.

7) Abrasion resistance.

8) Apparent reflectivity.

9) Washability.

10) Dry Opacity.

11) Recoating.

12) Skinning.

c. If results show materials being used do not comply with requirements, Engineer shall direct Contractor to stop Work, remove non-complying coating materials, and clean, prime, and recoat surfaces with approved materials. Contractor shall pay for the retesting until coating Work is approved by Engineer.

## 3.5 CLEANING

A. Remove rubbish, empty cans, rags, and other discarded materials from Project Site at the end of each Work day.

B. Clean glass and spattered surfaces after completing work. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent painted surfaces.

## 3.6 PROTECTION

A. Protect Work of other trades, whether being coated or not, against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as acceptable to Engineer. Leave in an undamaged condition.

1. Provide "Wet Paint" signs to protect newly coated finishes. Remove temporary protective wrappings provided by others to protect their Work after completing coating operations.

2. Touch up and restore damaged or defaced coated surfaces using same materials as the coating system.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Surface preparation and application of corrosion protective coatings and coverings for:

1. Underground metal piping including joints, fittings, and adapters
2. Underground metallic electrical conduits
3. Steel mounting hardware for cathodic protection aluminum anodes, exposed ductile iron, steel pipes, and joints or fittings under the wharf

B. The following underground pipes and conduits need not be protected by corrosion control coatings or coverings:

1. Metal materials encased in at least a 3-inch cover of concrete having a 28-day compressive strength of 2,500 pounds per square inch (psi) or greater.
2. Metal piping and equipment in pits which shall be dry and above the water table.
3. Soil pipe for drainage and gravity sewer lines.
4. Corrugated metal piping.
5. Conduit having an approved factory applied 40 mil PVC coating.

## 1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

B. Section 33 10 01 - Water Distribution

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires corrosion control.

## 1.4 REFERENCES

A. ASTM D1248 - Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.

B. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems.

C. SSPC-SP 6 - Commercial Blast Cleaning.

D. Reference Specifications (RS):

Section 210 - Paint and Protective Coatings

Subsection 210-1.1 General Requirements

1.5 SUBMITTALS

A. Submit list of materials to be used to Engineer. Submittal shall include descriptive literature from manufacturer.

1.6 REGULATORY REQUIREMENTS

A. Sandblasting shall meet South Coast Air Quality Management District (SCAQMD) requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver mastic in conformance with RS Subsection 210-1.1.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Butyl backed plastic tape wrap shall be factory laminated product consisting of butyl rubber backing and an outer layer of polyvinyl chloride or polyethylene plastic, with following physical characteristics:

| Thickness in Inches (minimum) | Adhesion |
|---|---|
| | |
| Overall of tape 0.023 | Grams per inch of |
| Plastic layer 0.008 | tape with 0.800 minimum |
| Butyl layer 0.010 | |

B. Polyethylene encasement for ductile or cast iron pipe shall be polyethylene encasement (either tube or sheet form) to conform to AWWA C105/A21.5 except encasement shall be lapped 2 feet at encasement joints. Polyethylene material shall conform to ASTM D1248.

C. The corrosion control used for steel mounting hardware for cathodic protection aluminum anodes, exposed ductile iron, steel pipes, and joints or fittings under the wharf shall be modified aluminum epoxy mastic corrosion system applied at factory or in controlled shop conditions. Only touch up may be done in field. Modified aluminum epoxy mastic shall be Carbomastic 15 by Carboline as distributed by Dunn Edwards, (800) 337-2468. Modified aluminum epoxy mastic shall have minimum solids by volume of 90 percent.

D. Galvanized metals pretreatment shall be Krud Kutter Metal Clean and Etch by Rust-Oleum, (770) 888-8827.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Surfaces to be wrapped in butyl back plastic tape shall be cleaned of oil, grease, soil, dust, other foreign matter and rust. Clean rust by SSPC-SP 6 blasting, with a 2 to 3 mil blast profile.

B. Surfaces to be protected by polyethylene encasement shall be clean of dirt.

C. Ground smooth welds, burrs, sharp edges, and sharp surface projections.

D. Remove weld splatter.

E. Surface preparation for modified aluminum epoxy mastic shall conform to SSPC-SP 6 blasting and paint manufacturer's written instructions.

3.2 APPLICATION

A. General:

1. Tools, equipment, and materials shall be maintained in working order.

2. Paint shall be mixed by mechanical mixer.

3. Compressed air for blast cleaning or painting shall be free of foreign matter. Equipment shall have traps and separators to trap oil and water.

4. The corrosion control systems for underground conduits or pipes shall terminate not less than 12-inches above ground or 12-inches into concrete pits or pull boxes.

5. Plastic tape may be used for metal pipe, tubing, and electrical joints and fittings. Plastic tape shall not be used on ductile iron or cast iron pipe.

6. Modified aluminum epoxy mastic shall be used on cast or ductile iron pipe and fittings above ground or under the wharf, and on underground steel casings. Provide continuous protection.

B. Plastic Tape Wrap:

1. Use rapid drying primer for the substrate. Primer shall be compatible with the tape.

2. Apply adhesive primer to a 1 mil dry-film thickness (approximately 300 square feet per gallon) by brushing, spraying, or other method recommended by the manufacturer. Surface shall be completely covered with the primer without sags or runs. Thinning shall be done with product recommended by the primer manufacturer.

3. Over the dry or slightly tacky primer coat, wrap a single layer of tape maintaining 4 pounds tension per inch of width of tape. No folds or irregularities shall be permitted and overlaps shall be maintained as follows (Values given are minimum permitted for lap widths listed):

| |
|---|
| 2-inch tape: 0.25 inch |
| |
| 4-inch tape: 0.375 inch |
| |
| 6-inch tape: 0.50 inch |
| |
| 9-inch tape: 0.50 inch |

4. Repair damaged areas of wrap by repeating the priming and wrapping steps.

C. Apply modified aluminum epoxy mastic system in conformance with manufacturer's written instructions and in an enclosed SCAQMD approved spray booth.

1. Clean galvanized metals to receive modified aluminum epoxy mastic in conformance with pretreatment wash manufacturer’s written instructions and apply pretreatment wash.

2. Apply 2 coats of modified aluminum epoxy mastic. Minimum dry film thickness for a 2-coat system shall be 16 mils.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Graffiti-resistant coatings

## 1.2 RELATED SECTIONS

A. Section 04 22 00 - Concrete Unit Masonry

B. Section 32 13 14 - Concrete for Exterior Improvements

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires graffiti-resistant coatings.

## 1.4 SUBMITTALS

A. Submit manufacturer's technical data, application instructions, safety data sheets (SDS), and published literature stating recommended coverage rates.

B. Apply coating on mock-up panel and sample panel for review and approval both for aesthetics and effectiveness, accompanied with a letter stating the actual application rates required to meet the warranty requirements.

## 1.5 QUALITY ASSURANCE

A. Comply with South Coast Air Quality Management District (SCAQMD) requirements including but not limited to volatile organic compounds (VOC) regulations.

B. Coatings shall be approved by City of Los Angeles City Department of Building and Safety.

1. Submit copy of City of Los Angeles Research Report with RR number.

C. Provide minimum 4 foot by 4 foot sample panel for each type of substrate to which anti-graffiti coating shall be applied. Apply proposed coating over half of substrate.

1. Accepted sample panel shall set standard for finish and quality of Work. Remove sample panel when directed by Engineer.

1.6 MAINTENANCE MATERIALS

A. Provide five 1 gallon cans of graffiti removing compound and 1 hand operated spray applicator to Department for maintenance purposes.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Monopole Monochem, (818) 500-8585.

2.2 MATERIALS

A. Coating shall be clear, non-yellowing, weather resistant, and ultra-violet resistant.

1. Unpainted Porous Surfaces:

a. First coat: Monochem Aquaseal Heavy Duty

b. Second Coat: Monochem Perma Shield Non-sacrificial Graffiti Control - Semi-gloss

c. Third Coat: Monochem Perma Shield Non-sacrificial Graffiti Control - Semi-gloss

d. Fourth Coat: Monochem Perma Shield Non-sacrificial Graffiti Control - Semi-gloss

2. Painted Surfaces:

a. First Coat: Monochem Perma Shield Sacrificial Graffiti Control - Semi-gloss

b. Second Coat: Monochem Perma Shield Sacrificial Graffiti Control - Semi-gloss

c. Third Coat: Monochem Perma Shield Sacrificial Graffiti Control - Semi-gloss

B. Primer as required and as recommended by coating manufacturer.

C. Graffiti remover as recommended by coating manufacturer.

## PART 3 - EXECUTION

### 3.1 PREPARATION

A. Surfaces to receive coatings shall be dry, free of dust, dirt, rust, alkali, efflorescence, oil, grease, loose and peeling paint, scale, and other foreign material.

B. Clean and prepare surfaces to receive coatings in conformance with manufacturer's written instructions.

1. Verify calks, concrete curing compounds, and sealers are fully cured and compatible with the coating.

2. Verify that painted surfaces are fully cured and compatible with coating.

C. Protect adjacent surfaces against spatter. Take special precautions to cover and protect finished Work.

### 3.2 APPLICATION

A. Prepare and mix coatings in conformance with manufacturer's written instructions.

B. Apply coatings when temperature is above 50 degrees Fahrenheit (F) but below 100 degrees F. Do not apply coating if rain is imminent within 24 hours.

C. Apply coatings using methods and equipment in conformance with manufacturer's written instructions and SCAQMD requirements.

D. Allow curing time between coats in conformance with manufacturer's written instructions.

E. Apply at exterior walls to a height of 10'-0" above grade to horizontal reveal, unless otherwise indicated on Drawings.

1. Do not coat aluminum entrances and storefront.

2. Do not coat aluminum windows.

F. Apply at exposed surfaces of concrete planter walls.

## 3.3 CLEANING

A. Clean spillage and overspray from adjacent surfaces as recommended by coating manufacturer.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Fabrication and installation of signage including but not limited to the following:

1. Secure sign permits including plan check required by City of Los Angeles Department of Building and Safety for the installation of exterior signage for Project. Department shall pay for fees associated with plan check and permits.

2. Sign Fabrication: Types of signs, messages, and graphics as indicated on Drawings and specified in this Section and required various materials, finishes, and fabrication and installation techniques.

3. Shop drawings, layouts, samples, and mock-ups for Engineer's approval.

4. Structural design and calculations for freestanding signage to confirm structural integrity of the designed support connection. Structural connections shall require certification by an engineer registered in State of California.

5. Installation of fabricated signs, including fasteners, fastenings, and related appurtenances.

6. Coordination and verification of messages with Engineer. Engineer shall provide a complete set of sign location plans with sample numbering system schedule template for fabricator to complete sign message schedule for submission and approval by Engineer.

7. Verification of conditions and sign dimensions in the field. Verification of conditions and sign dimensions shall be completed prior to sign fabrication and approval of required submittals.

8. Construct concrete footings for signage.

9. Removal Work to accommodate new sign installation.

## 1.2 RELATED SECTIONS

A. Section 05 05 14 - Treating Damaged Galvanizing

B. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires signage.

1.4 REFERENCES

A. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

B. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

C. AWS D1.1/D1.1M - Structural Welding Code - Steel.

D. ICC A117.1 - Accessible and Usable Buildings and Facilities.

1.5 SUBMITTALS

A. Shop Drawings:

1. Submit shop drawings in reproducible form for approval by Engineer prior to fabrication. The internal structure, dimensions, and specifications for items shall be indicated on shop drawings. Dimensions or specifications on shop drawings which do not conform to Drawings need to be noted as such and approved by Engineer.

a. Shop drawings shall include:

1) Complete fabrication and installation drawings for each sign type. Indicate elevations of each type of sign, dimensions, materials, finishes, fastening, details, anchorage and footings, joining, sealing, backing, and adjacent related Project Site condition. Include full size details of exposed edges, joints between materials, and details affecting the appearance.

2) Each sign with graphic elements.

3) Letter styles shall be accurately reproduced.

4) Provide half size letter and word spacing patterns for copy. Submit patterns with black copy on white background. Indicate outline of sign panel on pattern.

5) Provide full size patterns or prints of copy, arrows, and graphic elements to be applied.

6) No changes shall be made on shop drawings after approval of shop drawings except by written consent or direction of Engineer.

7) Substitution of items from those shown on shop drawings shall be made only when approved in writing by Engineer.

8) No material shall be ordered prior to approval of shop drawings.

B. Samples: Submit physical samples 12 inch by 12 inch or of sufficient size and quantity to illustrate materials, finishes, equipment or workmanship, and to establish standards by which completed Work shall be judged. Samples shall represent the functional characteristics of the product or material, with integrally related parts and attachment devices, colors, and finishes.

1. Samples shall have a place for approval stamp.

2. Submit complete sets of samples to Engineer for review.

3. Required samples for review:

a. Full 12 inch by 12 inch set of specified paint colors and finishes. Submit manufacturer's certification or recommendation for the paint and coating applicator.

b. Complete, full-size message in each typeface to demonstrate proper spacing (black text on white background, outline not accepted).

c. Sample of each type of fastener to be used.

d. Each type of exposed metal used for major elements of Work with respective finish.

e. Each type of adhesive vinyl film, including computer-cut designs shown full-size on each of the specified ground colors.

f. Complete list of prototypes. Prototypes shall become the property of Department and are not to be part of completed signs unless previously agreed upon.

g. Paint manufacturer's application instructions and color palette.

C. Structural design and calculations prepared and signed by a State of California registered engineer to substantiate design.

D. Installation details of fabricated signs, including fasteners and related footings.

E. Copies of permits prior to performing Work of this Section.

F. Unused mock-ups and submittals shall be removed from Project Site prior to final acceptance.

G. Submit operation manuals, tools, and keys as specified in this Section.

1.6 PERMITS

A. Contractor shall make submittals for each permit through Engineer. Contractor shall be responsible for making adjustments as required, or any task necessary for obtaining local building and installation sign permits for the proper execution of Work. Refer to REGULATORY REQUIREMENTS Section for payment requirements.

B. Secure sign permits, including plan check required by City of Los Angeles Department of Building and Safety for the installation of exterior signage for Project.

1.7 MAINTENANCE

A. Operation and Maintenance Manuals:

1. Provide Operation and Maintenance Manuals to Engineer in hard copy and electronic file format.

2. Furnish complete manuals describing the materials, devices, and procedures to be followed in operating, cleaning, and maintaining Work. Include manufacturer's brochures and parts lists describing the actual materials used in Work, including metal alloys, finishes, and other major components.

3. Assemble manuals for component parts into single binders identified for each system.

B. Instruction:

1. Prior to acceptance, establish with Engineer an instruction and training program for Department personnel.

2. Notify Engineer in writing at least 7 days prior to commencement of the program providing an outline of topics indexed to Operation and Maintenance Manual.

3. Provide a trained instructor. Provide 3 consecutive 4-hour periods of training scheduled during the normal 8-hour working day. Instruction and training shall include, but shall not be limited to, procedures to be followed in the normal day-to-day maintenance and operation of Work.

1.8 QUALITY ASSURANCE

A. Engineer reserves the right to inspect the manufacture or fabrication. Engineer's inspection of Work does not relieve Contractor of the responsibility for Work. Errors or faults that are discovered during fabrication shall be corrected by Contractor prior to installation.

B. If manufacturing site is within a 75-mile radius of Department Administration Building, Engineer shall inspect the sign manufacturing on-site at no cost to Contractor. If Project Site is beyond the specified radius, Contractor shall bear transportation and per diem costs for 1 full time Inspector at the manufacturing site. Transportation costs shall include transporting Inspector from and to Department Administration Building.

C. Welders shall be City of Los Angeles Department of Building and Safety certified.

D. Mock-ups and Prototypes:

1. Provide a mock-up (partial for large signs; complete for smaller signs) of each sign type requested at the fabrication facility for review. The requested sign types are shown on Drawings. Refer to Drawings for further information.

2. Utilize the same materials and installation methods in the mock-up as intended for final Work. Schedule the installation so that the mock-up may be examined, and any necessary adjustments made, prior to commencing fabrication of final Work. Replace unsatisfactory items as directed by Engineer.

3. When accepted, mock-up shall serve as the standard for materials, workmanship, and appearance for Work throughout Project.

4. The final mock-up shall be installed within Project as a complete and functioning sign/element as approved by Engineer. Any unused or unapproved mock-ups shall become property of Contractor and are not be part of completed Work.

E. Work-In-Progress Approvals:

1. Provide Work-in-progress sign elements reviews. Scheduled or unscheduled viewings at the fabrication facility may be initiated by Engineer as deemed necessary to ensure continued quality control and make any adjustments required during fabrication. Unsatisfactory items shall be corrected by Contractor as directed by Engineer.

F. Regulatory Requirements:

1. Comply with applicable requirements of the applicable laws and authorities. Obtain necessary approvals and permits from such authorities as required.

G. Final Location of Signs:

1. The location of signs as shown on the location plans is for general reference only and in some cases is not representative of the exact final location. Final locations of signs shall be field located in coordination with Engineer.

2. Contractor shall arrange for meetings at Project Site to accommodate direction of final locations conforming to Project Construction Schedule.

H. Lettering:

1. Contractor shall be responsible for the quality control of lettering. Letterforms shall be crisp, sharp, free of nicks, ragged edges, and discontinuous curves. Lettering shall conform to approved typeface, weight, and letter spacing. No substitutions of typeface foundry, brand, or version or implementation technique shall be accepted without prior approval of Engineer.

2. Vinyl Die Cut Graphics: Camera-ready artwork shall be anagraph scanned for cutting on a Gerber Sign Maker II.

3. Execute cutting and routing in such a manner that edges and corners of finished letterforms are true and clean. Letterforms with rounded positive or negative corners, nicked, cut, ragged edges, and the like shall not be accepted. Letterforms shall be aligned to maintain a baseline parallel to the sign format. Margins shall be maintained as indicated on Drawings.

4. Work of this Section shall be performed by skilled workers under the supervision of a trained foreperson, experienced in the trade of craft required to accomplish Work and produce a product of high quality.

I. High Quality of Workmanship:

1. Contractor shall be responsible for the high quality of materials and labor required for the execution of Work of this Section.

2. Contractor shall be responsible for providing up-to-date drawings, specifications, graphic schedule, and the like, to subcontractors.

J. Dimensions:

1. Written dimensions on Drawings shall have precedence over scaled dimensions.

2. Contractor shall verify and be responsible for dimensions and conditions shown by these drawings. Shop details shall be approved by Engineer prior to fabrication.

K. Discrepancies:

1. Notify Engineer of any discrepancies on Drawings, sign location plan or sign message schedule, in field dimensions, or conditions or changes required in construction details.

L. Regulatory Requirements:

1. Comply with applicable portions in American with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines and ICC A117.1.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Package signage separately or in like groups of names, labeled as to names enclosed; include installation template, hardware, or adhesive specified and installation instructions.

B. Deliver the materials to Project Site in their manufacturer's unopened shipping cartons with their contents and manufacturers' names clearly marked on the cartons. Store the products in protected undercover locations until their installation.

1.10 WARRANTY

A. Signage Warranty:

1. Submit to Engineer a 5-year written warranty (effective the date of final acceptance) covering signs, notarized by Contractor, agreeing to repair or replace the defective signs. Upon notification of such defective signs within the warranty period, make necessary repairs or replacement at the convenience of Engineer.

B. Linear Polyurethane Paint Factory Finish Warranty:

1. Submit to Engineer a 5-year written warranty, warranting that the factory-applied linear polyurethane finishes shall not develop excessive fading or excessive non uniformity of color or shade, and shall not crack, peel, pit, corrode or otherwise fail as a result of defects in materials or workmanship within the following defined limits. Upon notification of such defects within the warranty period, make necessary repairs or replacement at the convenience of Engineer.

a. Excessive Fading: A change in appearance which is perceptible and objectionable as determined when visually compared with the original color range standards.

b. Excessive Non-Uniformity: Non-uniform fading to the extent that adjacent panels have a color difference greater than the original acceptable range of color.

c. Shall Not Pit or Otherwise Corrode: No pitting or other type of corrosion, discernible from a distance of 10 feet, resulting from the natural elements in the atmosphere at Project Site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Architectural Design and Signs (AD/S) 1160 Street Corona, CA 92882, (951) 278-0680

B. ASI Signage Innovations 5846 Uplander Way Culver City, CA 90230, (310) 645-1400

## 2.2 DESIGN REQUIREMENTS

A. Design Criteria:

1. Structural Design: Drawings indicate a general design approach for sign fabrication but do not necessarily include fabricating details required for the complete fabrication and structural integrity of the signs, including consideration for static, dynamic, and erection loads during handling, erecting, and service at the installed locations. Provide complete structural design of the signs. Design of structural elements shall be prepared and signed by a licensed engineer registered in State of California. Signs shall meet applicable local, state, and national codes, as well as testing laboratory listings where required.

2. Final design shall be submitted to Engineer for approval.

## 2.3 MATERIALS

A. Specified Metals - General:

1. Aluminum:

a. Aluminum shall be suitable for ornamental, architectural Work. Surface finish shall be smooth, free of extrusion marks or imperfections. Alloy shall be selected to meet the structural requirements of the specific application.

2. Stainless Steel:

a. Stainless steel shall be suitable for ornamental and architectural Work. Surface finish shall be smooth, free of extrusion marks, or imperfections. Alloy shall be selected to meet the structural requirements of specific application.

3. Structural metal for concealed framing shall be of galvanized rolled steel and meet structural requirements.

B. Metals:

1. Steel Posts: Hot-dipped galvanized steel tubular post conforming to ASTM A500/A500M. Post shall be designed to accept and permit attachment of the panel framing system without exposed fasteners. Provide caps for each post.

2. Panel Framing System: Panel framing consisting of galvanized steel sections and interlocking track components shall be designed to interlock with posts with concealed fasteners. Top and bottom framing members shall be removable to permit panel removal.

3. Finish: Paint as shown on Drawings.

4. Aluminum posts shall be constructed from 2-inch square T52 tubes, 0.1875 wall thickness and No. 4 brushed and clear anodized finish with capped ends, unless otherwise indicated on Drawings.

5. Steel Plates and other Structural Sections: ASTM A572/A572M, hot-dipped galvanized.

C. Aluminum exterior cabinets, spacers, backplates and frames shall be constructed from 0.25-inch aluminum, No. 4 horizontal brushed and clear anodized finish, unless otherwise indicated on Drawings.

D. Extruded aluminum shapes utilizing 6063-T6 aluminum alloys, unless otherwise indicated on Drawings.

E. Concrete installation of anchoring devices into concrete slab shall be adjusted to avoid penetrating existing reinforcing conduit contained in the concrete slab. Coordinate with Engineer.

F. Stainless steel exterior cabinets, spacers, backplates and frames shall be constructed from 0.125-inch stainless steel, No. 4 horizontal brushed and clear anodized finish, unless otherwise specified on Drawings.

G. Stainless steel interior plaques shall be constructed from 0.125-inch thickness stainless steel sheet, No. 4 horizontal brushed finish with semi-gloss linear polyurethane clear coat, unless otherwise indicated on Drawings.

H. Stainless steel interior fabricated components shall be constructed from 0.0625-inch stainless steel, unless otherwise indicated on Drawings.

I. Acrylic intended for non-illuminated use shall be 0.25 inch cast acrylic sheet with non-glare finish, unless otherwise specified on Drawings.

J. Decal or Transfer: Provide special printed paper or vinyl suitable for reproducing the design onto material indicated, as required. Submit sample to Engineer for approval.

K. Hardware and Hinges: Provide and install incidental hardware necessary for the proper functioning of the signs, including, but not restricted to, materials and products covered in this Section. Provide stainless steel hinges for hinged access panels. Provide pin tumbler locks for access panels requiring locks. Provide stainless steel fasteners for assembling ferrous and non-ferrous metals.

L. Bolts, nuts, screws, washers, anchors, and other devices required to complete Work. Contractor shall use the same basic metal or alloy as the metal fastened, and finish to match in color and texture. Use stainless steel 300 series alloy where used to join dissimilar materials.

M. Exposed fasteners shall be 0.125-inch flathead stainless steel screws painted to match adjoining surfaces unless otherwise specified on Drawings.

N. Pin-mount supports shall be 3/16 inch to 1-inch diameter painted threaded rods as appropriate.

O. Insulation/Material Isolation: Separate ferrous and non-ferrous metals with non-conductive gaskets to prevent electrolysis. In addition to gaskets, provide stainless steel fasteners for some cases as required.

P. Welding Electrodes and Filler Metal:

1. Provide the alloy and type of welding electrodes and filler metal required for strength, workability, compatibility, and color match after grinding smooth and finishing the fabricated product.

Q. Applied interior vinyl graphics shall be high performance cast vinyl sheeting, unless otherwise indicated on Drawings. Applied exterior vinyl graphics shall be high performance reflective vinyl sheeting, unless otherwise indicated on Drawings.

R. Additional Material and Processes: For materials and processes described in the preceding list, the material and/or process as detailed in the design documents shall be used as the meet or exceed equivalent.

S. Paint finishes shall be Matthews Acrylic Polyurethane with Matthews Primers and Metal Pre-Treatments.

T. Shop painting to be uniform on and around sign elements to ensure sign elements shall withstand weather conditions.

U. Concrete for Footings: As specified in CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

2.4 FINISHING MATERIALS

A. Linear Polyurethane Coatings: Provide the following, or other products as approved by Engineer:

1. Acrylic Linear Polyurethane Enamel: 2 components, acrylic aliphatic isocyanate/acrylic polyurethane having ultraviolet (UV) inhibitors and engineered for exterior application by Matthews Paint Company.

2. Primer for Aluminum: 2-part component primer: 1-coat Matthews 74-734 and 74-735 Metal Pretreat at 0.25 mils dry film thickness or 1-coat Matthews 74-793 Spray Bond at 0.15 to 0.25 mils dry film thickness or AKZO Grip-Guard Wash Primer (2Afy-31284) with Grip-Guard Wash Primer Hardener (10AFK-31285) combined and applied in conformance with manufacturer's written instructions for the application of the pre-approved and pre-formulated paint system.

3. Primer for Steel: 2-part component primer: 1-coat Matthews 74-734 and 74-735 Metal Pretreat at 0.25 mils dry film thickness or AKZO Grip-Guard Wash Primer (2Afy-31284) with Grip-Guard Wash Primer Hardener (10AFK-31285) combined and applied in conformance with manufacturer's written instructions for the application of the pre-approved and pre-formulated paint system.

4. Clear Sealers: Crystal clear matte polyurethane sealers by Matthews Paint Company. Sealers shall resist rust and corrosion associated with exposure to salt air. As required and of highest quality available, applied in conformance with manufacturer's written instructions.

B. Anodized Aluminum Components/Panels: If required, Contractor shall provide anodized (application of aluminum oxide film coating in clear or colored dye finish) aluminum panels or parts to match color, grain, finish, and specifications.

C. Silk Screening Materials: Provide photo processed screening, arranged to furnish sharp and solid images without edge build up or bleeding of the coating. Pattern-cut screens may be used for non-repeat copy, provided that final image copy is equal to photoscreen quality. Provide only weather-resistant coating materials, compatible with the intended substrates. Silk-screened graphics shall be done with the finest screen size feasible for sharp, even reproduction.

D. Vinyl Die-Cut and Pattern Cut-out Graphics: Use Scotchcal Opaque and Translucent film and Scotchcal Diamond Grade VIP Reflective film manufactured by 3M where specified. Use pressure-sensitive, non-yellowing, non-peeling, and weather resistant vinyl as specified. Use approved fonts and equipment as specified.

2.5 FABRICATION

A. Signage shall be complete for proper installation as described on Drawings.

B. Finished Work shall be firm, well anchored, in true alignment, properly squared, with smooth clean uniform appearance, without holes, cracks, discoloration, distortion, stains, or marks.

C. Construct Work to eliminate burrs, dents, cutting edges, and sharp corners.

D. Welding shall be in conformance with American Welding Society (AWS) requirements. Finish welds on exposed surfaces shall be unnnoticeable in finished Work.

E. Except as indicated or directed otherwise by Engineer, finish surfaces smooth.

F. Surfaces, which are intended to be flat, shall be without dents, bulges, oil canning, gaps, or other physical deformities.

G. Surfaces, which are intended to be curved, shall be smoothly free-flowing to required shapes.

H. Except where approved otherwise by Engineer, conceal fasteners.

I. Make access panels tight-fitting, lightproof, and flush with adjacent surfaces.

J. Conceal identification labels and Underwriters Limited labels to conform to Underwriters Limited Codes.

K. Carefully follow manufacturer's written instructions for fabricating procedures regarding expansion or contraction, fastening, and restraining of acrylic plastic.

L. Exercise care to ensure that painted, polished, and plated surfaces are unblemished in finished Work.

M. Isolate dissimilar materials. Exercise particular care to isolate nonferrous metals from ferrous metals with non-conductive gaskets and stainless steel fasteners.

N. Ease exposed metal edges.

O. Provide miscellaneous metal items required for completion of Work even though not shown or specified.

P. Refer to Drawings for sign color specifications.

Q. Mounting: Mounting plates shall be in conformance with manufacturer's written instructions.

R. Markings and Labels:

1. Locate markings, labels, manufacturer names, and other identifications so as to be concealed from public view and as acceptable by Engineer.

2. No trade name or other identification shall appear on any item where it shall be seen by the public except as specifically approved by Engineer in advance.

2.6 FABRICATION OF SIGNS AND SUPPORTS

A. General: Provide custom manufactured sign assemblies and components completely fabricated and finished at factory before delivery to Project. Construct to accurate detail and dimensions as shown and as reviewed on approved shop drawings. Fit and assemble signs at the shop and mark the components as required to facilitate assembly during installation. Exposed fasteners on finished faces shall not be allowed, unless specifically indicated. Waviness and oil canning of surfaces is not acceptable. Minimum material thickness shall be 0.090 inch.

B. Lettering: Cut and rout in a manner to produce true and clean edges and corners of finished letterforms. Letterforms having rounded positive or negative corners, nicked, cut, or ragged edges are not acceptable. Align letter forms to maintain a baseline parallel to the sign format. Maintain margins as indicated on Drawings.

C. Seams and Joints: Contractor shall cut walls and floors carefully and neatly repair them in an acceptable manner. Contractor shall consult Engineer in cases where cutting into a structural portion of the building is required so that satisfactory reinforcement may be provided. Added joints shall be ground filled and finished flush and smooth with adjacent Work. Such seams shall be invisible after final finish has been applied. Spot welded joints shall not be visible on exterior of signs after final finish has been applied. No gaps, light leaks, waves, or oil canning shall be permitted in Work. If any of these are evident, Contractor shall correct its Work or construct a new sign at Contractor’s sole cost and expense.

D. Metal Signs and Supports: Fabricate exposed surfaces uniformly flat and smooth, without distortion, pitting, or other blemishes. Form exposed metal edges to a smooth radius. Permanently bond the laminated metal components and honeycomb core with adhesive or sealant in conformance with product manufacturer’s written instructions. Grind exposed welds and rough areas to make flush with adjacent smooth surfaces.

E. Welding:

1. Make welds continuous.

2. Welding shall be in conformance with AWS requirements. Finish welds on exposed surfaces shall be unnoticeable in finished Work.

3. Comply with AWS, Aluminum Association (AA), and Copper Development Association (CDA) standards for the type of metal used.

4. Welding inspection and testing shall conform to Section 6 of AWS D1.1/D1.1M.

F. Fasteners:

1. Use exposed fasteners only if shown on Drawings.

2. Perform drilling and tapping at shop.

3. Fasteners shall be fully concealed wherever possible. Provide counter sunkscrews for access panels or where exposed fasteners are required. Methods of fastening shall be detailed and exact specifications for all fasteners shall be noted on shop drawings. Any portion of mounting brackets which are visible shall match wall, frame, or hardware of sign color as indicated.

G. Dissimilar Materials: Where metal surfaces shall be in contact with dissimilar materials, coat the surfaces with epoxy paint, plate with zinc chromate, or provide other means of dielectric separation as recommended by manufacturer to prevent galvanic corrosion (i.e. Neoprene gasket as an isolation membrane).

H. Castings: Exposed surfaces shall be uniformly free from porosity and roughness. Edges shall be filled and ground smooth. Faces shall be chemically etched and mechanically polished for specified finish.

I. Galvanizing: Provide for steel components in exterior construction and where noted on Drawings to be galvanized. Complete the shop fabrication prior to application of the zinc coating. Remove mill scale and rust, clean and pickle the units as required for proper pretreatment of the surfaces.

J. Hardware: Provide incidental hardware necessary for the proper functioning of signs. External hardware shall conform to the external appearance of the sign.

K. Supports and Backing in Walls: Contractor shall provide engineered sign supports anchored to building structure where required and to meet requirements of applicable City of Los Angeles Building Code. Support or backing requiring installation within the building wall construction shall be immediately relayed to Engineer for field coordination.

L. Access Doors and Frames: Access doors and frames shall be flush with the material in which they occur, unless otherwise specified. Access doors and frames shall be provided upon prior written approval of Engineer. Each trade providing access doors and frames shall verify the need for fire rated doors on Drawings. Access doors in walls, partitions, or ceilings shall bear Underwriters Laboratories, Incorporated (UL) fire rated labels of same fire rating. If access doors and frames are required to be exposed to view, they shall be chrome, brass, stainless steel, or other finish to match other finishes in the spaces in which they are to be installed, unless otherwise specified. Obtain Engineer’s approval for location of each access door prior to placement.

M. Treat damaged galvanizing in conformance with TREATING DAMAGED GALVANIZING Section.

2.7 GRAPHIC APPLICATION

A. Preparation: Surfaces to receive the graphic markings shall be clean, dry, and otherwise made ready for application of the materials. Accurately measure and lay out the required marking configurations as indicated on Drawings.

B. Vinyl Die-cut and Pattern-cut Graphics: Use pressure sensitive, non-yellowing, non-peeling, and weather resistant vinyl adhesive letters or images, custom flood coated as required, die cut from Scotchcal or Scotchlite as manufactured by 3M Company. Apply in strict conformance with manufacturer's written instructions. Make uniformly smooth and free from bubbles, wrinkles, stretching, and blemishes.

C. Painted or Silk-screened Graphics: Graphics shall be applied using photo processed screens from camera ready art, arranged to furnish sharp and solid images without build-up or bleeding of the coating. Comply with coating manufacturer's written application instructions. Provide proper type of primer to suit each substrate and obtain a permanent bond. Verify compatibility of each substrate with the coatings to be used in Work. Apply the markings with neat edges, minimum 3 mils (0.075 mm) dry film thickness and as required to obtain solid markings without voids.

D. Graphics and message shall be applied to panel using silkscreen process. Silkscreened images shall be executed with photo screens prepared from original art. No handcut screens shall be accepted. Original art is defined as artwork that is a first generation stencil of the original specified art.

E. Edges and corners shall be clean. Rounded corners, cut or ragged edges, edge buildup, bleeding or surfaces pinholes shall not be accepted.

F. Refer to Drawings for graphics and messages and required signage.

G. Graphics, message, and colors shall be in accordance with Drawings. Type face shall be as shown on Drawings.

## 2.8 SHOP APPLICATION OF SIGN FINISHES

A. Sign Graphics: Provide the letters, numerals, symbols, and other graphics markings, using the finish materials shown. Apply the graphics neatly, uniformly proportioned and spaced, and accurate within the dimensions indicated. Prepare the substrate surfaces and apply finish materials in conformance with manufacturer's written instructions.

B. Metal Finishes: Remove scratches, abrasions, dents, and other blemishes before applying finish. Apply the following finishes to the fabricated Work, with texture and reflectivity as required to match the approved sample:

1. Linear Polyurethane Finishes: Clean the surfaces as required for proper adhesion of coatings. Use 3M Co. "Scotch Brite" pads with cleanser and water, or chemically treat as recommended by paint manufacturer to remove deleterious film or residue.

2. Linear Polyurethane Paint: Provide pretreatment and primer in conformance with manufacturer's written instructions. Add ultra violet inhibitors to paint subject to sunlight exposure.

3. Clear Linear Polyurethane Finish: Provide pretreatment, primer, and matte or semi-gloss finish coatings in conformance with manufacturer's written instructions. Apply 1.5 to 2.0 mils (0.0375 to 0.050 mm) dry film thickness.

# PART 3 - EXECUTION

## 3.1 VERIFICATION OF CONDITIONS

A. Inspect surfaces to receive signage and report defects which would interfere with signage installation.

B. Verify conditions and sign dimensions in field. Contractor shall review and study architectural, landscape, lighting, electrical, and related plans to ensure proposed signs can be installed and supported. Verification of conditions and sign dimensions shall be completed prior to sign fabrication.

C. Starting Work implies acceptance of surfaces as satisfactory.

## 3.2 INSTALLATION

A. Install signage in accordance with Drawings and approved submittals and shop drawings.

B. Special Precautions: Guard against damaging existing pavements, structures, landscaping, planting, and other improvements where signage is to be installed.

C. Footings beneath topping surface shall be installed and located prior to top surface installation. Construct footings in accordance with approved shop drawings.

D. Prior to installation, check components, nuts, bolts, and other connections for proper alignment, fit, and any damage. Replace damaged or defective components.

E. Concrete Footings:

1. Construct footings in accordance with approved shop drawings and CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

2. Concrete installation of anchoring devices into concrete slab shall be adjusted to avoid penetrating existing reinforcing contained in the concrete slab. Coordinate with Engineer.

F. Installed signs shall be clean, properly aligned, level and true to line and dimension, flush to surface unless otherwise specified, and free of imperfections and excess visible adhesive if used, with no damage to signs or surrounding surfaces.

G. Where stud fastening or other mechanical fasteners are used, provide adequate mounting to prevent unauthorized removal of sign.

H. Finish surfaces shall be free of brush marks, streaks, laps, or pile up of paints, with all surfaces uniformly covered.

## 3.3 REPAIR AND RESTORATION

A. Repair or replace existing structures and improvements damaged or removed as a result of Contractor's operations.

## 3.4 CLEANING

A. Keep areas of Work clean, neat, and orderly at all times. Clean surfaces, inside and out. Use approved cleaners to remove dirt.

B. Remove protective coverings and strippable films at a time that ll afford the greatest protection of the furniture signage. Clean surfaces to remove excess sealant compounds, dirt, and other substances.

C. Upon completion of Work and before final acceptance, remove tools, surplus materials, apparatus, unused mock-ups, and debris from Project Site. Leave Project Site in a neat, clean condition, acceptable to Engineer. Wash, clean, and leave paved areas without stains.

3.5 PROTECTION

A. Protect signs from damage until acceptance. Repair any damage to signs or surrounding surfaces.

3.6 FINAL INSPECTION AND ACCEPTANCE

A. Upon completion of Work of this Section, a final inspection for acceptance shall be performed by Engineer.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Toilet accessories including related appurtenances:

1. Lavatory guards
2. Mop and broom holder
3. Baby changing station
4. Coat hook
5. Combination seat cover
6. Tissue dispenser
7. Soap dispenser
8. Napkin disposal
9. Hand dryer
10. Sanitary napkin/tampon vendor
11. Trash can

## 1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry

B. Section 09 22 16 - Non-Structural Metal Framing

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items that requires toilet accessories.

## 1.4 REFERENCES

A. California Code of Regulations (CCR) Title 24

1.5 SUBMITTALS

A. Product Data:

1. Manufacturer's specification and other data required to demonstrate compliance with specified requirements.

2. Manufacturer's installation instructions.

3. Complete descriptive data on fasteners proposed for each type of wall construction or partition; recommended mounting locations and mounting instructions.

B. Shop Drawings: Submit for approval each item specified under this Section. Indicate location of backing required to attach to wall.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and products in original containers with seals unbroken and labels intact until time of use. Label shall identify accessory, catalog number, and finish.

B. Store delivered products in clean, safe, dry area.

1.7 PROJECT CONDITIONS

A. Coordinate as required with Work of other sections to ensure proper backing for installation of accessories.

B. Sequencing, Scheduling: Do not install accessories until after completion of finish painting and tile Work.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Bobrick Washroom Equipment, Incorporated.

B. Koala Kare.

C. Elkay.

2.2 MATERIALS

A. General: Manufacturer's catalog numbers listed on Drawings indicate design, quality, capacity, function, and finish desired. Locks of fixtures from the same manufacturer shall be keyed alike.

B. Anchors and Fasteners: Provide anchors and fasteners capable of developing a retaining force commensurate with the strength of the accessory to be mounted or installed and well suited for use with supporting construction. Provide reinforcing plates where required to support loads imposed as a result of the usage of the accessory.

2.3 ACCESSORIES

A. Refer to accessories list shown on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive toilet accessories and verify that:

1. Backing for proper installation of accessories are in place.

2. Surfaces are dry, clean, free from foreign matter, and otherwise proper for installation.

3. Toilet compartments to receive accessories have been properly installed and correctly prepared.

B. Do not start Work until unsatisfactory conditions have been corrected and approved by Engineer.

3.2 INSTALLATION

A. Install toilet accessories in conformance with manufacturer's written instructions, and comply with disabled accessibility and use requirements, including Americans with Disabilities Act (ADA) Design Guidelines, CCR Title 24, and requirements of City of Los Angeles Department of Building and Safety, and approved shop drawings.

B. Provide necessary blocking for mounting. Attach accessories securely with concealed fastenings unless otherwise noted on Drawings. Ensure true alignment.

C. Adjust as required for correct operation.

## 3.3 ADJUSTING AND CLEANING

A. Upon completion of Work, or when directed by Engineer, remove traces of protective coatings or paper.

B. Adjust accessories for proper operation. Test mechanisms, hinges, locks and latches and where necessary, adjust, and lubricate.

C. Clean and polish exposed surfaces prior to final acceptance.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Fire extinguishers and cabinets

## 1.2 RELATED SECTIONS

A. Section 09 22 16 - Non-Structural Metal Framing

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires fire extinguishers and cabinets.

## 1.4 SUBMITTALS

A. Submit Product Data for fire extinguishers and cabinets including rough-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style, door construction, panel style, and materials.

B. Submit Shop Drawings showing layout and dimensions of fire extinguishers and cabinets. Indicate relationship to adjoining surfaces. Show cabinet elevations, details, and accessories. Indicate installation and anchorage requirements.

C. Samples for verification purposes in full-size units of each type of cabinet finish indicated, and in sets for each color, and model specified, showing full range of variations.

## 1.5 QUALITY ASSURANCE

A. Single-source responsibility: Obtain extinguishers and cabinets from one source from a single manufacturer.

B. Underwriters Laboratories, Incorporated (UL)-listed products: Fire extinguishers shall be UL listed with UL listing mark for type, rating and classification of extinguisher.

C. FM-listed products: Fire extinguishers approved by Factory Mutual (FM) Research Corporation for type, rating, and classification of extinguisher with FM marking.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHER CABINETS

A. Surface Mounted Cabinets: Embassy Continental Series as manufactured by J.L. Industries, Tel. No. (612) 835-6850.

1. Size: As indicated on Drawings:

2. Series Number: 8014, steel, primed for field painting.

3. Door: F12, Full glass, 1/4 inch clear acrylic.

4. Provide with ADAC option to provide projection within Americans with Disabilities Act (ADA) guidelines.

B. Semi-Recessed Cabinets: ClearVU Series as manufactured by J.L. Industries.

1. Size: As indicated on Drawings.

2. Series Number: 1515, steel, primed for field painting.

3. Door: 25, full acrylic, clear bubble with double strength glass.

4. Provide with ADAC option to provide projection within ADA guidelines.

2.2 FIRE EXTINGUISHERS

A. Ratings shall be as required by Los Angeles City Fire Department:

1. In mechanical and electrical rooms provide UL rating 8-B:C; 5-pound capacity.

2. Other areas shall be UL rating 2A:10:B:C, 5-pound capacity.

B. Extinguishers shall be FM and City of Los Angeles Fire Department approved.

C. Provide steel mounting brackets for each extinguisher indicated to be surface mounted.

1. Factory finish brackets with baked-on enamel; red color.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Install in conformance with manufacturer's written instructions.

B. Install plumb, level, and straight.

C. Fit to adjoining surfaces, using attachments and fasteners recommended by the manufacturer.

D. Coordinate location for fire extinguishers with Engineer and the local fire department inspector.

E. Install cabinets free of stress to allow smooth operation of doors.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Playground layout (staking).

B. Concrete footings for playground equipment.

C. Playground equipment.

D. Location of each item of playground equipment is indicated on Drawings.

1.2 RELATED SECTIONS

A. Section 12 93 01 - Site Furnishings

B. Section 31 00 00 - Earthwork

C. Section 32 13 14 - Concrete for Exterior Improvements

D. Section 32 18 16.13 - Playground Protective Surfacing

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment

1. Payment for Work of this Section shall be paid under the Playground Equipment bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ABA Standards - ABA Accessibility Standards.

B. ADA Standards - 2010 ADA Standards for Accessible Design.

C. ASTM F1292 - Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment.

D. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use.

E. CPSC Pub. No. 325 - Public Playground Safety Handbook.

F. ICC A117.1 - Accessible and Usable Buildings and Facilities.

1.5 DEFINITIONS

A. Play Structure: A piece of playground equipment that supports 1 or more play activities.

B. Use Zone: The area under and around a play event within which the ground surfacing must meet fall impact attenuation requirements of ASTM F1292 when tested at the fall height specified for the play event.

C. Fall Height: The vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it, as defined in ASTM F1487.

D. Protective Surfacing: Resilient ground surfacing, specified in PLAYGROUND PROTECTIVE SURFACING Section. The characteristics of the protective surfacing are based on the fall height of the playground equipment. Changes in either the surfacing or the fall height, particularly reducing the resilience of the protective surfacing or increasing the fall height, shall reduce safety-related performance.

E. Subgrade: The surface of the ground on which the protective surfacing is installed; the subbase for the protective surfacing is installed over the subgrade.

1.6 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meetings: Convene a meeting 2 weeks before starting earthwork for playground to discuss coordination between various installers.

1. Require attendance by personnel responsible for grading and installers of playground equipment, protective surfacing, footings, and adjacent Work.

2. Include representatives of Contractor.

3. Notify Engineer at least 2 weeks prior to meeting.

1.7 SUBMITTALS

A. Submit to Engineer manufacturer's literature on equipment to be provided. Product data shall show materials of construction, compliance with specified standards, installation procedures, safety limitations, and the number of users permitted.

B. Shop drawings of play structures, including rails, posts, and fastening hardware shall be submitted. Show assembly and installation details.

C. Manufacturer's written guarantee for minimum period of 1 year from date of installation. Guarantee shall cover replacement of any damaged components, not including vandalism or improper use.

D. Product Data: Include physical characteristics such as materials, dimensions, and finish. Manufacturer's data sheets on each product to be used, including:

1. Preparation instruction and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

E. Installation Documentation: Shipments shall include a packet of order-specific, step-by-step instructions for assembly of each component, including equipment assembly diagrams, estimated hours for assembly, footing dimensions, concrete quantity for direct bury components, fall height information, and area required information.

F. Maintenance Data: Provide manufacturer's written instructions for maintenance and list of replaceable parts for each equipment item, with address and phone number of source of supply.

G. Manufacturer's written field report.

H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Department's name and registered with manufacturer.

I. Maintenance Kit: A maintenance kit shall be provided for each Play Structures design ordered. The kit shall include a maintenance document with recommendations on how often to inspect, what to look for, and what to do to keep the equipment in like-new condition. The kit shall also include appropriate color touch-up paint and additional installation tools for the tamperproof fasteners.

1.8 QUALITY ASSURANCE

A. Maintain 1 copy of ASTM F1487 and CPSC Pub. No. 325 at Project Site.

B. Manufacturer Qualifications: Company regularly engaged in manufacturing materials and products specified in this Section, with not less than 5 years of experience.

1. Provide documentation showing that playground equipment similar to that specified has been installed in minimum 10 sites and been in successful service for minimum of 5 years; provide addresses.

2. Manufacturer's Representative: Provide name, company name and address, and playground safety training certificate.

C. Installer Qualifications - An experienced installer familiar with local building codes and with the latest safety guidelines, who has completed installation of playground structures similar in material, design, and extent to that indicated for this project, and whose work has resulted in construction with a record of successful in-service performance. Installer shall be certified by manufacturer for training and experience with specific play events and equipment. Minimum 2 year experience installing similar products

D. Product Options - Drawing indicates size, components and dimensional requirements of playground structure and is based on the specific system indicated.

E. Play structures shall be certified and validated to be in conformance with ASTM F1487.

F. Unless otherwise noted, play structures are considered accessible according to ADA Standards. (See the play components listing for each structure to determine the number of additional play components required to meet the guidelines.)

1. Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Standards and ICC A117.1 for playground equipment designated as accessible.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store equipment to Project Site in conformance with written manufacturer's written instructions.

B. Inspect components on delivery to ensure that no damage occurred during shipping or handling. Materials shall be stored in original undamaged packaging in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism, and theft until ready for installation. Inspect components prior to installation.

1.10 WARRANTY

A. Landscape Structures Inc. warrants that play structures and/or equipment sold shall conform in kind and in quality to the specifications manual for the products identified in the Acknowledgement of Order and shall be free of defects in manufacturing and material. Manufacturer further warrants:

1. 100-Year Limited Warranty: On PlayBooster, PlayShaper, and PlaySense aluminum posts, stainless steel fasteners, clamps, beams and caps against structural failure due to corrosion/natural deterioration or manufacturing defects, and on PlayBooster steel posts against structural failure due to material or manufacturing defects.

2. 15-Year Limited Warranty: On Evos and Weevos steel arches, plastic components (including TuffTimbers edging), aluminum and steel components not covered above, Nobius climbers, Rhapsody Outdoor Musical Instruments, decks and TenderTuff coatings (except Wiggle Ladders, Chain Ladders and Swing Chain) against structural failure due to material or manufacturing defects.

3. 10-Year Limited Warranty: On concrete products against structural failure due to natural deterioration or manufacturing defects. Does not cover minor chips, hairline cracks efflorescence.

4. 5-Year Limited Warranty: On Rhapsody cables and mallets against defects in materials or manufacturing defects.

5. 3-Year Limited Warranty: On other parts, i.e: Pulse products, swing seats and hangers, Mobius climber handholds, Wiggle Ladders, Chain Ladders, and ProGuard Swing Chain, Track Ride trolleys and bumpers, rocking equipment including Sway Fun gliders, belting material, HealthBeat resistance mechanism, Seesaws, etc., against failure due to corrosion/natural deterioration or manufacturing defects.

6. The environment near a saltwater coast can be extremely corrosive. Some corrosion and/or deterioration is considered "normal wear" in this environment. Product installed within 500 yards (457 meters) of saltwater shoreline shall only be covered for half the period of the standard product warranty, up to a maximum of five years, for defects caused by corrosion. Products installed in direct contact with saltwater or that are subjected to salt spray are not covered by the standard warranty for any defects caused by corrosion.

7. This warranty does not include any cosmetic issues or wear and tear from normal use. It is valid only if the play structures and/or equipment are erected to conform with Landscape Structures' installation instructions and maintained according to the maintenance procedures furnished by Landscape Structures Inc.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Landscape Structure Inc., which is located at: 601 S. 7th St.; Delano MN 55328-0198; Contact: Reswest Outdoor Products, Scott Anderson fro equipment proposal. Phone: 818-309-5596. Email: Scott@recwest.com. Web: https://www.playlsi.com.

B. Products and Color Selections per Design ID: 1179481-01-14.

C. Each play equipment shall have permanent labels that indicates age requirement/restriction.

D. Play equipment layout in accordance with Drawings.

2.2 MATERIALS

A. FitCore Extreme Area:

1. Equipment including the following:

a. FitCore Extreme Welcome Sign.

1) Model: 246315A.

b. FitCore Extreme Angled Balance Beam Double.

c. FitCore Extreme A-Frame Cargo Net.

1) Model: 243016A.

d. FitCore Extreme Angled Overhead Ladder.

1) Model: 243907A.

e. FitCore Extreme Globe Grasp.

1) Model: 243870A.

f. FitCore Extreme Jump Hang.

1) Model: 243190A.

g. FitCore Extreme Peg Bridge.

1) Model: 243862A.

h. FitCore Extreme Unstable Bridge.

1) Model: 244063A.

i. FitCore Extreme Wheel Bridge.

1) Model: 243899A.

j. FitCore Extreme Rope Climb.

1) Model: 243910A.

B. Health Beat Fitness Stations:

1. Health Beat Ab Crunch/Leg Lift.

a. Model: 192451A.

2. Health Beat Assisted Row/Push-Up.

a. Model: 192452A.

3. Health Beat Balance Steps.

a. Model: 192454A.

4. Health Beat Parallel Bars.

a. Model: 192453A.

5. Health Beat Plyometrics.

a. Model: 192459A.

6. Health Beat Pull-Up/Dip.
    a. Model: 192460A.
7. Health Beat Stretch.
    a. Model: 192462A.
8. Health Beat Posts.
    a. Model: 205941A.
    b. Model: 205942A.
    c. Model: 205944A.
    d. Model: 205947A.
9. Health Beat Sign Set.
    a. Model: 20760A.

C. South Playground.

1. Custom Playbooster/Evos Play Structure. Includes the following equipment:
    a. Canyon Climber:
        1) Model: 176081A.
    b. Deck Link with Barriers, Steel end panels 2 Steps:
        a) Model: 152907B.
    c. Traveler Climber with 2 Hanger Brackets:
        a) Model: 200609A.
    d. Logo Climber with Vibe Handholds 64 inch Deck Height:
        a) Model: 179018A.
    e. Lollipop Climber with Vibe Handholds 64 inch Deck Height:
        a) Model: 179019B.

f. Mobius Climber with Vibe Handholds 72 inch Deck Height:

    a) Model: 303836A.

g. Pod Climber with Vibe Handhold 24 inch Deck Height DB Right Handhold:

    a) Model: 179013A.

h. Snake Climber with Vibe Handholds 64 inch Deck Height DB:

    a) Model: 178957B.

i. Sunbeam Climber with Vibe Handhold:

    a) Model: 179022A.

j. 90 Triangular Tenderdeck:

    1) Model: 122197A

k. Curved Transfer Module Left 32 inch Deck Height:

    1) Model: 152911A.

l. Hexagon Tenderdeck:

    1) Model: 178710A.

m. Kick Plate 8 inch Rise:

    1) Model: 121948A.

n. Triangular Tenderdeck:

    1) Model: 111231A.

o. Tri-Deck Kick Plate 8 inch Rise:

    1) Model: 12949A

p. Color Splash Vibe Panel Above Deck:

    1) Model: 179044A.

q. Hole Vibe Panel Ground Level:

    1) Model: 179046A

r. OptiGear Vibe Panel Above Deck:

1) Model: 179051A.

s. Rain Sound Wheel Vibe Panel Above Deck:

1) Model: 179052A.

t. Blender Spinner DB:

1) Model: 201545A.

u. 108 inch Alum Posts:

1) Model: 111404F.

v. 116 inch Alum Posts:

1) Model: 111404E.

w. 124 inch Alum Posts:

1) Model: 111404D.

x. 132 inch Alum Posts, 42 inch Bury:

1) Model: 111404O.

y. 140 inch Alum Posts:

1) Model: 111404B.

z. 148 inch Alum Posts:

1) Model: 111404A.

aa. 156 inch Alum Posts:

1) Model: 111404K.

bb. 164 inch Alum Posts:

1) Model: 111404L.

cc. 174 inch Alum Posts, 60 inch Bury for Cool Toppers on Hex Deck, Custom:

1) Model: 176762B.

dd. CoolToppers Full Sail for Hex Deck, Custom:

1) Model: 176761A.

ee. Double Swoosh Slide, 72 inch Deck Height:

1) Model: 130390A.

ff. Single Wave Slide 64 inch Deck Height DB:

1) Model: 131437A.

gg. Clamp No Faces (O-O):

1) Model: 156439A.

hh. Clamp One Face (A-A):

1) Model: 156440A.

ii. Clamp One Face (O-E):

1) Model: 157585A.

jj. Clamp Two Faces 180 (C-C):

1) Model: 156442A.

kk. Clamp Two Faces 180 (E-E):

1) Model: 157586A.

ll. Swiggle Stix:

1) Model: 156450A

mm. Helix Net:

1) Model: 156449A

nn. O-Zone Climber:

1) Model: 156448A

oo. Evos 2 Arch with 3-5 Attach Points:

1) Model: 179188A

pp. E-Pod:

1) Model: 156454A

qq. Wobble Pod:

1) Model: 156452A

rr. Bow Ladder Connector:

1) Model: 165533A

2. Custom Integrated Swing and Hypar Sail:

a. Friendship Swing with ProGuard Chains and Clamps:

1) Model: CP001343.

b. Integrated Swing - Custom Hypar Sail:

1) Model: CP036747.

c. Belt Seat ProGuard Chains for 8 foot Beam Height:

1) Model: 174018A.

d. Swing HGRASY/Clevis:

1) Model: 111418.

3. Custom Independent Bell X-1 Pipe Climber:

a. Model: CP038682.

b. Language on Tail Wing: "1931 WILMINGTON-CATALINA AIRLINE"

4. Double Bobble Rider:

a. Model: 164075B.

5. Flywheel Spinner:

a. Model: 185927A.

6. Saddle Spinner, 16 inch Height:

a. Model: 152179A.

7. TopsyTurny Spinner 42 inch Bury:
    a. Model: 205800A.
8. Welcome Sign:
    a. Model: 182503C

D. North Playground:

1. Pod Climber 8 inch, 6 Sets:
    a. Model: 120710A.
2. Single Hill Loop 36 inch OC:
    a. Model: CP001153.
3. Set of 12 Hillside Climbing Handgrips:
    a. Model: CP008524.
4. Custom Control Tower Play Structure. Includes the following equipment:
    a. Sway Fun Wheelchair Glider 12 inch height:
        1) Model: 170894A.
    b. 12 inch Ramp with Guardrails and Curbs:
        1) Model: 174815A.
    c. Ramp with Guardrails with Curbs:
        1) Model: 156232A.
    d. Ramp Berm Exit Plate Concrete Wall:
        1) Model: 120325A.
    e. Mini Summit Climber, 40 inch Deck Height DB:
        1) Model: 153076A.
    f. Custom DTR 190 inch Steel Post for 104 inch Deck, 44 inch Bury:
        1) Model: CP013840A.

g. Custom Control Tower Hex Roof:

1) Model: CP002463.

h. Angled Window Panel for Control Tower Roof:

1) Model: CP002462.

i. Curved Transfer Module Right 2-5 Years 32 inch Deck Height:

1) Model: 184354A.

j. Hexagon Tenderdeck:

1) Model: 178710A.

k. Kick Plate 16 inch Rise:

1) Model: 121948B.

l. Pot Climber 8 inch DB:

1) Model: 120710A.

m. Square Deck Extension:

1) Model: 111229A.

n. Triangular Tenderdeck:

1) Model: 111231A.

o. Triangular Tenderdeck Extension:

1) Model: 119646A.

p. Navigator Reach Panel Above Deck:

1) Model: 127439A.

q. Pilot Panel Above Deck:

1) Model: 119514A.

r. Chimes Panel Above Deck:

1) Model: 115243A.

s. Gear Panel Above Deck:

1) Model: 117146A.

t. Ring-a-Bell Panel Above Deck:

1) Model: 159459A.

u. Accessible Panel Curb:

1) Model: 191031A.

v. Handhold Panel Set, 2 Handhold Panels:

1) Model: 127953A.

w. Zoo Panel Above Deck:

1) Model: 115227A.

x. 16 inch Deck DB Alum Post Standard Flush Cap:

1) Model: 111405H.

y. 116 inch Alum Post DB:

1) Model: 111404E.

z. 76 inch Alum Post DB:

1) Model: 111404J.

aa. 92 inch Alum Post DB:

1) Model: 111404H.

5. Custom Weevos Play Structure. Includes the following equipment:

a. Boppity Bridge DB:

1) Model: 164178A.

b. Swiggly Stix Bridge DB:

1) Model: 173575A.

c. Giggle Jiggler DB:

1) Model: 164171A.

d. WV Wee Planet Climber:

1) Model: 173573A.

e. Weevos 3 Arch Mainstructure DB:

1) Model: 164170A.

f. Cozy Coaster Slides with Handrail and with Stairs under Large Arch:

1) Model: 164174A.

6. Custom Sensory Play Structure. Includes the following equipment:

a. Sensory Play Center Wall:

1) Model: 168100A.

b. Sensory Play Center Wall End:

1) Model: 168101A.

c. Sensory Play Station Plate:

1) Model: 168661A.

d. Bongo/Xylofun Panel:

1) Model: 168666A.

e. Color Splash Panel:

1) Model: 177715A.

f. Saddle Spinner DB 12 inch Height:

1) Model: 152179A.

g. Double Bobble Rider DB:

1) Model: 164075B.

h. OmniSpin Spinner Surface Mount:

1) Model: 173591A.

i. Welcome Sign:

1) Model: 182503A.

j. Toddler Swing Frame:

1) Model: 177336A.

k. Full Bucket Seat ProGuard Chains for Toddler Swing:

1) Model: 176038G.

E. Rhapsody Playground:

1. Rhapsody Cascata Bells:

a. Model: 250340A.

2. Rhapsody Goblet Drum:

a. Model: 214443A.

3. Rhapsody Kettle Drum:

a. Model: 214445A.

4. Rhapsody Kundu Drum:

a. Model: 214444A.

5. Rhapsody Tongue Drum Junior with Mallet:

a. Model: 250341A.

6. Rhapsody Tongue Drum with Mallet:

a. Model: 253114A.

7. Rhapsody Vibra Chime 8:

a. Model: 252550A.

8. Rhapsody Jingle Metallophone:

a. Model: 228213A.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under Project conditions.

3.3 INSTALLATION INSTRUCTIONS AND AIDS

A. To guide installation, each structure shall be accompanied by bills of materials, written instructions, an erection plan view drawing, and a footing plan location drawing to be furnished prior to or with the delivery of the play structure. To facilitate assembly, each part shall be indelibly stenciled with an easily-read identification number keyed to the bills of materials and erection drawings. Components shall be shipped unitized, protectively wrapped, branded for mechanical handling and ready for assembly.

3.4 INSTALLATION

A. Playground equipment shall be assembled and installed in strict conformance with manufacturer's written instructions, true to the dimensions, layout, and details shown on Drawings.

1. Install play structure in compliance with manufacturer’s written instructions.

2. Install components in sequence as recommended by manufacturer.

3. Install play structure as indicated on Drawings provided.

4. Variations from the installation indicated must be approved.

5. Variations from the installation indicated and costs for removal and replacement shall be the responsibility of Contractor.

6. Warranty the replacement of any warranty item for the entire manufacturer’s warranty period at no cost to Department.

B. Locate positions of play equipment supports with proper clearances as dimensioned on Drawings, and as called for on manufacturer's shop drawings.

C. Coordinate Work with preparation for and installation of protective surfacing specified in PLAYGROUND PROTECTIVE SURFACING Section. The resilient portion of the protective surfacing is to be installed after playground equipment installation.

D. Anchor equipment securely below the bottom elevation of the resilient surfacing layer.

E. Install without sharp points, edges, or protrusions; entanglement hazards; or pinch, crush, or shear points.

F. Do not modify play events on site without written approval of manufacturer and Engineer.

G. Install required signage if not factory-installed.

H. Concrete footings shall be to depth and dimension per manufacturer's written instructions.

I. Install members at proper heights, levels, in plumb or horizontal relationships as required. Assemble structures in conformance with approved shop drawings. Final installations shall be stable, secure and free from any hazardous projections.

J. Touch up finishes damaged during installation with finish kits provided by manufacturer.

3.5 FIELD QUALITY CONTROL

A. Obtain the services of the equipment manufacturer's field representative to review the finished installation for compliance with specified requirements and with design criteria to the extent known to Contractor; submit report of field review. Manufacturer's representative shall provide written certification that play equipment has been installed in strict conformance with manufacturer's guidelines and standards.

B. Engineer shall inspect playground equipment after installation to verify that playground meets specified design safety and accessibility requirements.

C. Repair or replace rejected Work until compliance is achieved.

3.6 CLEANING

A. Restore adjacent existing areas that have been damaged from the construction.

B. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation. Clean in conformance with manufacturer's written instructions, using cleaning agents as recommended by manufacturer.

C. Clean playground area of excess construction materials, debris, and waste.

D. Remove excess and waste material and dispose of off Department property in conformance with requirements of authorities having jurisdiction.

3.7 DEMONSTRATION

A. Instruct Department’s personnel on proper operation and maintenance of playground components.

3.8 PROTECTION

A. Protect installed products until date of Substantial Completion.

B. Touch-up, repair, or replace damaged products before date of Substantial Completion.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Site furnishings including footings and related appurtenances:

1. Bicycle rack
2. BBQ grills
3. Concrete hot coal receptacle
4. Picnic table
5. Bench
6. Trash and recycle receptacle
7. Drinking fountain
8. Retractable bollard
9. Dog bag station
10. Skate deterrent
11. Shade structure
12. Dedication block with plaque

## 1.2 RELATED SECTIONS

A. Section 03 45 00 - Precast Architectural Concrete

B. Section 05 50 00 - Metal Fabrications

C. Section 32 13 14 - Concrete for Exterior Improvements

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Site Furnishings bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

B. ASTM A312/A312M - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.

C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

D. ASTM A959 - Standard Guide for Specifying Harmonized Standard Grade Compositions for Wrought Stainless Steels.

E. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

F. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.

G. ASTM D523 - Standard Test Method for Specular Gloss.

H. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

I. ASTM D3359 - Standard Test Methods for Rating Adhesion by Tape Test.

J. ASTM D3363 - Standard Test Method for Film Hardness by Pencil Test.

K. ASTM D3451 - Standard Guide for Testing Coating Powders and Powder Coatings.

1.5 SUBMITTALS

A. Make submittals no later than 30 Calendar Days after Notice to Proceed date.

B. Product Data: Submit complete lists of items proposed under this Section to Engineer. Include manufacturer's name and address, specific trade names, catalog numbers complete with installation instructions, illustrations, and descriptive literature. Clearly mark or underline proposed items in red; list sources of materials.

C. Shop Drawings:

1. Verification: Show dimensions, sizes, thicknesses, gages, finishes, joining, attachments, and relationship of Work to adjoin construction. Where items must fit and coordinate with finished surfaces or constructed spaces, take measurements at Project Site and not from Drawings.

2. Coordination: Where concrete, masonry, or other materials must be set to exact locations to receive Work, furnish assistance, and direction necessary to permit other trades to properly locate their Work.

3. Welded connectors, Concrete, or Masonry Inserts: Where required to receive Work, show exact locations, and furnish such Drawings to the trades responsible for installing the connectors or inserts.

4. Submit shop drawings for the following items:

   a. Dedication block with plaque.

   b. Shade Structures.

D. Samples:

1. Upon approval of the product materials and shop drawing submittals, provide sample, indicating surface finish, color and texture, for approval by Engineer of furnishings. Approved samples may be used on Project Site location with approval by Engineer. Submit the following:

   a. Submit 3 sets of 2 inch by 2 inch material samples of manufacturer's available colors for concrete hot coal receptacle.

   b. Submit 3 sets of 2 inch by 2 inch manufacturer's available concrete integral color mix samples for dedication block.

2. Additional samples shall only be required if requested in writing by Engineer. Submit samples for approval, within 14 Calendar Days of written request.

3. Samples shall be complete with specified sizes, colors, finishes, and required mounting hardware. Sample shall be shipped prepaid by Contractor and shall be furnished promptly upon request.

4. Samples shall remain on Project Site as an example of the materials, quality of Work, finish, color, tolerance, and general quality of other furnishings of the respective type to be installed on Project. Furnishings inferior to the sample shall be rejected and installation shall not be permitted. Furnishings installed without approval shall be removed and replaced with approved furnishing at Contractor’s sole cost and expense.

E. Disapproval: Resubmit for approval necessary data concerning a substitution for a disapproved item. Approval of an item, alternate, or substitute indicates only that the product or products appear to meet the requirements of Drawings and Specifications on the basis of the information or samples submitted.

F. Operations and Maintenance Manuals: Prepare and deliver to Engineer within 10 Calendar Days prior to completion of construction, 3 hard cover 3 ring binders containing the following information:

1. Index sheet stating Contractor's address and telephone number, list of equipment with name and addresses of local manufacturer's representatives.

2. Catalog and parts sheets on every material and equipment installed under Contract.

3. Warranty statements on site furnishings.

4. Complete operating and maintenance instruction on furnishings furnished.

G. Equipment to be furnished: Supply Department with 2 sets of special tools required for removing, disassembling, and adjusting each type of furnishing supplied in Project.

1.6 QUALITY ASSURANCE

A. Mock-ups

1. Once samples have been approved by Engineer, provide a full size mock-up of dedication block with plaque. Mock-up shall incorporate, attachment points color, and finish in conformance with approved sample at least 15 Calendar Days in advance of construction for Engineer's approval.

2. Locate where directed by Engineer.

3. Engineer shall inform Contractor of approval or rejection of mock-up. If a mock-up is rejected, Contractor shall provide mock-up for approval by Engineer at no additional cost to Department.

4. Upon request, Engineer may require minor modifications to be made to the mock-ups. The revised mock-ups shall be provided at no additional cost to Department.

5. Once mock-ups have been approved by Engineer, retain approved mock-ups during construction as standard for judging completed Work.

6. Remove mock-up(s) from Project Site upon complete on Project.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Notify Engineer 7 Calendar Days prior to time of delivery.

B. Deliver site furnishings and specified component parts to Project Site in protective packaging as furnished by manufacturer. Packaging for each unit shall be clearly labeled.

C. Store units at Project Site to prevent exposure to weathering, vandalism, or damage from Work of other trades. Damaged materials shall be rejected. Remove damaged materials from Project Site and replace.

D. Comply with manufacturer's written instructions for proper storage, handling, and protection.

1.8 VERIFICATIONS OF DIMENSIONS AND QUANTITIES

A. Verify scaled dimensions and quantities prior to start of Work.

B. Notify Engineer of discrepancies between Drawings and Specifications and actual Project Site conditions which would affect the execution of the installation Work. Do not Work in areas where discrepancies occur until instructed by Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide miscellaneous metal items and materials required for completion of Work, even though not shown or specified.

B. Bike Rack: Manufacturer: Landscape Forms, Inc. 7800 E. Michigan Ave. Kalamazoo, Michigan 49048. Contact David Silverman & Associates, Inc. Kathy Rutkin, Phone 818-541-6691, Email: kathy@dsa-lighting.com. Model: BO999-06012-SM, Bola Bike Rack, Marine Grade 316 Stainless Steel, #4 Satin Electropolish finish, attachment as specified in Drawing.

C. Trash and Recycle Receptacles:

1. Model:435-64SH-0001, 0-435-EC-02, 0-435-MC-08 & 0-435-EC-04.

2. 64-gallon recycling receptacle with shield, side opening end cover with two 4 inch diameter hole, side opening mid cover with no holes, and side opening end cover with two 5 by 10 trash.

3. Manufacturer: Dumor Inc. 138 Industrial Circle Mifflintown, PA 17059, Contact: Recwest Outdoor Products, Derrick Shima, Phone 848-735-3838, Email: Derrick@recwest.com, Website: www.dumor.com.

4. Color: Sudan, Signage: Laser cut lettering for "Bottles & Cans" and "Trash".

5. Attachment as specified in Drawings.

D. Drinking Fountain:

1. Model: LD4420DB & LD4471LHB, 300 Series Stainless Outdoor Bi-level pedestal fountain with pet station non-filtered non-refrigerated drinking fountain with locking hose bid, Color: Evergreen, Manufacturer: Elkay Manufacturing Company 1333 Butterfield Road, Suite 200 Downers Grove, IL, 60515, Phone: 800-476-4106, Email: Custcare@elkay.com, Website: www.elkay.com.

E. Dog Bag Station: Model: 1001, Dog bag dispenser station with 400 bags single ply bag, Manufacturer: Mutt Mitt, Color: Dark green, footing as specified in Drawings, Website: www.muttmitt.com.

F. BBQ Grill: DuMor Model No. 24-00. Manufacturer: DuMor Inc. 138 Industrial Circle Mifflintown, PA 17059, Phone: 800-598-4018. Fax: 717-436-9839. Email: sales@dumar.com. Website www.dumar.com. Color: Heat resistant black enamel, footing as specified in drawing. Contact: Recwest Outdoor Products, Derrick Shima, Phone: 848-735-3838, Email: Derrick@recwest.com.

G. Concrete Hot Coal Receptacle: Model: TF1131, 53-gallon capacity. Anti-theft lock for steel grate. Manufacturer: Wausau Tile Inc. Material: Concrete. Finished Exposed aggregate. Attachment per manufacturer's recommendation, Website: www.wausautile.com.

H. Picnic Table: Manufacturer: DuMore Inc. 138 Industrial Circle Mifflintown, PA 17059. Contact: Recwest Outdoor Products, Derrick Shima, Phone: 848-735-3838, Email: Derrick@recwest.com, Website: www.dumor.com.

1. DuMor Model 525 Series:

a. Picnic Table - Type A, Model: 525-80I, Material: IPE wod and steel, Color: Textured Silver for steel, Attachment as specified in Drawing.

b. Picnic Table - Type B, Model: 525-884I, Material: IPE wood and steel, Color: Textured Silver for steel, Accessible seating, Attachment as specified in Drawing.

c. Materials:

1) Supports:

a) End Supports shall be manufactured from 1/2 inch by 6 inchASTM A36/A36M carbon steel flat bar and 3/8 inch thick ASTM A36/A36M steel plate.

2) Table and seat assembly wood slat:

a) Seat assembly shall be manufactured from 2 inch by 4 inch nominal IPE wood slats, 1/4 inch thick ASTM A36/A36M steel plate and 3/8 inch thick ASTM A36/A36M steel plate.

d. Dimensions:

1) 8 foot table. Picnic table - Type A per drawing.

a) Overall: 95 inches long by 78 inches deep by 31 inches high.

2) ADA side accessible 8 foot table. Picnic table - Type B per drawing.

a) Overall: 95 inches long by 78 inches deep by 31 inches high.

e. Finish:

1) Powder Coating

a) Parts are processed through an 8-stage iron phosphorous wash system.

b) Parts are coated with a zinc-rich epoxy primer to an average of 4-5 mils.

c) Parts are then finished with a top coat of TGIC-polyester powder to an average of 4-5 mils.

d) Powder is cured at the powder manufacturers specifications using combination of infrared and convection heat for approximately 20 minutes.

e) Finished parts shall comply with the following for coating and coating method: ASTM D523, ASTM D3363, ASTM D3359, ASTM D2794, ASTM B117, and ASTM D3451. Color: Textured silver.

2. DuMor Model 76 Series:

a. Picnic Table - Type C, Model: 76-24I, Material: IPE wood an steel, Color: Textured Silver for steel, footing as specified in Drawings.

b. Picnic Table - Type D, Model: 76-23I, Material: IPE wood and steel, Color: Textured Silver for steel, Accessible seating, footing as specified in Drawings.

c. Materials:

1) Table Support:

a) Table supports shall be 4 inch by 4 inch by 3/16 inch wall ASTM A500/A500M steel tubing and 3/8 inch thick ASTM A36/A36M steel plate. Color: Textured silver.

2) Table Top Assembly Wood:

a) Table top assembly shall be manufactured from 1/4 inch thick ASTM A36/A36M steel plate, 3/8 inch thick ASTM A36/A36M steel plate and wood slats.

3) Seat Assembly Wood:

a) Seat assembly shall be manufactured from 2 1/2 inch by 2 1/2 inch by 1/4 inch wall ASTM A500/A500M steel tubing, 3/8 inch thick ASTM A36/A36M steel plate and wood slats.

4) Slat Sizes:

a) Wood: 2 inch by 4 inch, 3 inch by 4 inch and 4 inch by 4 inch nominal IPE wood.

5) Anchoring:

a) Mounting: Embedded per drawings.

d. Dimensions:

1) 3 seat table

a) Overall: 80 inches long by 63 1/2 inches deep by 30 inches high (2 inch by 4 inch wood only).

2) 4 seat table

a) Overall: 80 inches long 80 inches deep by 30 inches high (2 inch by 4 inch wood only).

e. Finish:

1) Powder Coating

a) Parts are processed through an 8-stage iron phosphorous wash system.

b) Parts are coated with a zinc-rich epoxy primer to an average of 4-5 mils.

c) Parts are then finished with a top coat of TGIC-polyester powder to an average of 4-5 mils.

d) Powder is cured at the powder manufacturers specifications using combination of infrared and convection head for approximately 20 minutes.

e) Finished parts shall comply with the following for coating and coating method ASTM D523, ASTM D3363, ASTM D3359, ASTM D2794, ASTM B117, and ASTM D3451.

I. Bench: Manufacturer: DuMore Inc. 138 Industrial Circle Mifflintown, PA 17059. Contact: Recwest Outdoor Products, Derrick Shima, Phone: 848-735-3838, Email: Derrick@recwest.com, Website: www.dumor.com.

1. Benches Type A and Type C: DuMor Model 520 Series. Bench Type A per drawing. Model: 520-60-002I, Description: 6 feet bench, IPE wood seat, 3 arms. Wood slats run vertically, with backrest. Bench Type C per drawing. Model: 521-60-005I. Description: 6 feet bench, IPE wood seat, 3 arms. Wood slats run vertically, no backrest. Wood: IPE wood, Color: Textured Silver for steel.

a. Materials:

1) Supports:

a) End Supports shall be manufactured from 1/2 inch by 6 inchASTM A36/A36M carbon steel flat bar and 3/8 i thick ASTM A36/A36M steel plate.

2) Seat assembly wood slat:

a) Seat assembly shall be manufactured from 2 inch by 4 inch nominal wood slats, 1/4 inch thick ASTM A36/A36M steel plate and 3/8 inch thick ASTM A36/A36M steel plate.

3) Backrest assembly wood slat:

a) Backrest assembly shall be manufactured from 2 inch by 4 inch nominal wood slats, 1/4 inch thick ASTM A36/A36M steel plate and 3/8 inch thick ASTM A36/A36M steel plate.

4) Intermediate armrests:

a) Intermediate armrests shall be manufactured from 1/4 inch thick ASTM A36/A36M steel plate and 1/2 inch by 2 1/2 inch ASTM A36/A36M carbon steel flat bar.

5) Anchoring:

a) Surface-mount as specified in Drawings.

b. Dimensions

1) 6 foot bench.

a) Overall 71 inches long by 19 13/16 inches deep by 33 1/16 inches high.

c. Finish:

1) Powder Coating.

a) Parts are processed through an 8-stage iron phosphorous wash system.

b) Parts are coated with a zinc-rich epoxy primer to an average of 4-5 mils.

c) Parts are then finished with a top coat of TGIC-polyester powder to an average of 4-5 mils.

d) Powder is cured at the powder manufacturers specifications using combination of infrared and convection head for approximately 20 minutes.

e) Finished parts shall comply with the following for coating and coating method ASTM D523, ASTM D3363, ASTM D3359, ASTM D2794, ASTM B117 and ASTM D3451.

2. Bench Type B: DuMor Model 104 Series. Model No.: 104-60-3AR/S-1. Description: 6 feet backless perforated steel bench with 3 armrests. Color: Bronze.

a. Materials:

1) Supports:

a) End Supports shall be manufactured from 1/2 inch by 3 inch ASTM A36/A36M carbon steel flat bar.

2) Seat Assembly:

a) Seat surface shall be manufactured from 10 gauge ASTM A1011/A1011M steel plate.

3) Intermediate armrests:

a) Intermediate armrests shall be manufactured from 1/2 inch by 3 inch ASTM A36/A36M carbon steel flat bar.

4) Anchoring:

a) Mounting: Embedded.

b. Dimensions:

1) 6 foot bench.

a) Overall: 77 inches long by 20 inches deep by 25 7/16 inches high.

c. Finish:

1) Powder Coating

a) Parts are processed through an 8-stage iron phosphorous wash system.

b) Parts are coated with a zinc-rich epoxy primer to an average of 4-5 mils.

c) Parts are then finished with a top coat of TGIC-polyester powder to an average of 4-5 mils.

d) Powder is cured at the powder manufacturers specifications using combination of infrared and convection head for approximately 20 minutes.

e) Finished parts shall comply with the following for coating and coating method ASTM D523, ASTM D3363, ASTM D3359, ASTM D2794, ASTM B117, and ASTM D3451.

J. Retractable Bollard: Model No.: R8472. Description: Double locking retractable bollard with white reflective stripe. MaterialL 316 grade stainless steel with #6 satin finish. Manufacturer: Reliance Foundry Co. Ltd. Phone: 604-547-0460 or 1-877-789-3245. Fax: 604-590-8875. Website: https://www.reliance-foundry.com/bollard, Email: info@reliance-foundry.com.

1. Material: [Coated] Stainless Steel. Pipe: ASTM A312/A312M, Grade TP 316. Plate: ASTM A959, Grade TP 316. Country of Origin: China. Bollard [Designer's Designation]: Model: Reliance Foundry; r-8472. Height: 35-1/2 inch. Diameter: 4-1/2 inch. Weight: 25 pounds (lbs). Design: Retractable cylinder with flat top. Lock: Receiver with key.

2. Color Coating:

    a. Type: Polyester powder coat over epoxy primer.

    b. Color: [Stainless Steel - Brushed]

    c. Reflective Stripe: [White]

3. Installation:

    a. Retractable, New Concrete:

        1) Receiver

        2) Locking: In raised position.

K. Skate Deterrent - Type A: Manufactured by Skate Stoppers; Phone: 619-447-6374, www.skatestoppers.com. Model No.: GR05SS. Material: 316 Stainless Steel.

L. Skate Deterrent - Type B: Manufactured by Grind to a Halt, Phone: 630-365-2375, Model: HemisphereGrinder Minder, Material: 316 Stainless Steel.

M. Dedication Block with Plaque:

1. Custom pre-cast concrete with bronze plaque, plaque shall be 1-1/4 inch thick cast bronze, Plaque Finish: Gold painted/brushed, Plaque mounting: Blind mount with epoxy, Plaque size: 18 inches by 18 inches, Plaque shall include 1 embossed logos and texts provided by Engineer.

2. Fabricate as shown on Drawings and in accordance with Engineer-approved shop drawings.

N. Shade Structure: Manufacturer: Skyways by Landscape Structures, 8131 Forney Road Dallas, TX, 75227. Contact: Recwest Outdoor Products, Scott Anderson for equipment proposal, Phone: 848-309-5596, Email: Scott@recwest.com. Products and Color Selections per design ID: 1179481-01-14.

1. Shade structure Type A, Model: 267671H Single post pyramid 16 feet by 16 feet, 14 feet entry height with rapid release.

2. Shade structure Type B, Model: 267675H Cantilever single post pyramid 16 feet by 16 feet, 14 feet entry height with rapid release.

3. Shade structure Type C, Model: 267726H Single post hypar rod 16 feet by 16 feet, 14 feet entry height with rapid release.

O. Cast Iron Grate and Drain for Drywell: Manufacturer: EJco, Model: A-2010 G/F 26x26 Galvanized and with lock screws, Contact: EJco Califrornia Branch, Address: 287 Orange Show Lane, San Bernadino, CA, 92408, Phone: 909-352-7290, Email: california.branch@ejco.com.

P. Concrete For Footings: As specified in CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

PART 3 - EXECUTION

3.1 PREPARATION

A. Inspections: Verify that conditions are satisfactory for installation of site furnishings. Proceed with Work of this Section when unsatisfactory conditions have been corrected.

B. Acceptance: Do not install site furnishings prior to acceptance by Engineer of material and substantial completion of Project Site to receive such materials.

C. Special Precautions: Guard against damaging existing pavements and planting where Project Site furnishings are to be installed.

D. Footings beneath topping surface shall be installed and located prior to top surface installation.

3.2 INSTALLATION

A. Install furnishings in conformance with manufacturer’s specifications and written installation instructions and as indicated on Drawings.

B. Prior to installation, check components, nuts, bolts, and other connections for proper alignment, fit, and any damage. Replace damaged or defective components.

C. Component parts shall be anchored securely in place in conformance with the manufacturer’s specifications and shall not permit any unintended movement.

D. Install furnishings plumb, level, square, in true alignment and firmly anchored. Verify specific furniture orientation with Engineer prior to installation.

E. Furnishings shall be firmly anchored in concrete footings or secured with anchors to concrete footings as specified by the manufacturer and as indicated on approved submittal.

F. Finished Work shall be firm, well anchored, in true alignment, properly squared, with smooth clean uniform appearance, without holes, cracks, discoloration, distortion, stains, or marks.

3.3 CLEANING

A. Keep areas of Work clean, neat and orderly at all times. Clean surfaces, inside and out.

B. Protective coverings and strippable films shall be removed at a time that shall afford the greatest protection of the furniture. Clean surfaces to remove excess glazing and sealant compounds, dirt and other substances.

C. Upon completion of Work and before final acceptance, remove tools, surplus materials, apparatus, and debris from Project Site. Leave Project Site in a neat, clean condition, acceptable to Engineer. Wash, clean, and leave paved areas without stains.

3.4 FINAL INSPECTION AND ACCEPTANCE

A. Upon completion of Work, a final inspection for acceptance shall be performed by Engineer.

B. Mock ups and unused submittals shall be removed from Project Site prior to final acceptance of Work.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Plumbing Work including but not limited to the following:

1. Service connections to sewer and water mains.
2. Sanitary lines, soil, waste, vent lines, cleanouts, downspouts, and roof drains.
3. Hot and cold water lines and condensate drains.
4. Floor drains.
5. Pipe hangers and supports.
6. Installation of pipe, valves, fittings, and pressure reducing valve.
7. Pipe coverings, insulation, and waterproofing.
8. Plumbing fixtures and trim.
9. Plumbing connections to equipment specified in other divisions.
10. Back siphonage protection.
11. Water hammer arresters.
12. Trap primers.
13. Electric hot water heater.
14. Hose bibbs.
15. Access panels for cleanouts, valves, and water hammer arresters.
16. Excavating, trenching and backfilling.
17. Grouting and cleanup.
18. Disinfecting of water system.
19. Identification of pipe line and valves.
20. Testing.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry

B. Section 07 92 00 - Joint Sealants

C. Section 09 90 01 - Painting for Exterior Improvements

D. Section 31 50 01 - Excavation Safety Requirements

E. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid for under the Restroom Building bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

B. ASTM B88 - Standard Specification for Seamless Copper Water Tube.

C. AWWA C651 - Disinfecting Water Mains.

D. Reference Specifications (RS):

Section 207 - Gravity Pipe

Subsection 207-9 - Cast Iron Soil Pipe

Section 306 - Open Trench Conduit Construction

Subsection 306-1 - General

1.5 DEFINITION OF “PIPING”

A. The term “piping” as used in Specifications or on Drawings shall mean pipe, fittings, nipples, valves, unions, as may be required for a complete and functional system.

1.6 GENERAL

A. For purpose of clarity, Drawings are generally diagrammatic omitting offsets and small details. Certain pipe runs are shown distorted to avoid confusion. Where locations are fixed by dimension notations, follow as closely as possible. Horizontal runs of piping shall be kept in zones allocated as shown on mechanical plans unless otherwise approved by Engineer.

B. Exact locations shall be as required for installation avoiding interference with architectural, structural features, and Work of other trades. Preserve head room and keep openings and passageways clear. Make arrangements neat and occupy minimum space. Install piping parallel or at right angles to structures at the elevations indicated. Provide flanges and unions where flanges are required to permit servicing, removal, and reconnection of each item of equipment.

C. Provide openings as necessary for passage of pipes through walls, floors, partitions, and other construction whether indicated on Drawings or not.

D. Do not cut structural members without written authorization by Engineer. Where permitted, provide reinforcement as directed by Engineer.

E. Protect Work to prevent damage to materials and installation. Cover fixtures and equipment during construction.

F. Provide record drawings in conformance with PROJECT RECORD DOCUMENTS Section.

1.7 SUBMITTALS

A. Shop drawings, list of materials, fixtures, and equipment:

1. Submit for review within 45 days after date of award of contract. Delays resulting from improper and untimely submittals shall be responsibility of Contractor.

B. Materials Lists:

1. Complete list of materials, fixtures, and equipment with names and addresses of manufacturers including names and addresses of local distributors, catalog numbers, trade numbers, trade names, illustrations and descriptive literature for each article proposed. Pertinent data for each article shall be underlined in each copy of each catalog or brochure in which it is described. Clearly mark and identify substitute items.

C. Modifications to Drawings:

1. Provide modification to Drawings in each case where proposed substitute materials or equipment shall require (for proper installation) changes to the design of Project as indicated on Drawings. Appropriate proposed revision Drawings prepared by a licensed Engineer shall be furnished by Contractor for approval by Engineer. Such Drawings shall be complete for proper installation of the proposed substitute materials or equipment and construction. Cost of Drawings and cost of the proposed revised construction shall be at sole cost and expense of Contractor.

D. Manuals:

1. Deliver to Engineer 3 bound copies of maintenance and operating manuals of equipment installed in Project.

1.8 INSPECTION

A. Contractor shall not allow or cause any of Work to be covered up or closed in until it has been inspected, tested, approved by authorities having jurisdiction, and until Project Record Drawings have been properly annotated.

B. Should any of Work be covered up or closed in before such inspection, Contractor shall uncover Work to the satisfaction of Engineer, at Contractor's sole cost and expense. Related repair Work cost shall be at sole cost and expense of Contractor.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Place orders for equipment in time to prevent any delay in construction schedule or completion of Project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet construction schedule, together with any special handling charges, shall be at sole cost and expense of Contractor.

B. Materials shall be delivered in ample quantities from time to time as may be necessary for the uninterrupted progress of Work. They shall be stored as to cause the least obstruction to the premises and distributed so as to prevent overloading to any portion of the structure.

C. Work, equipment, and materials shall be protected. Contractor shall repair or replace damage caused either directly or indirectly by Contractor. Contractor shall close pipe openings with caps or plugs during installation. Upon completion, Work shall be thoroughly cleaned and delivered in as new condition.

1.10 DAMAGE BY LEAKS

A. Contractor shall be responsible for damage to any part of the premises by their Work, caused by leaks or breaks in the piping or equipment furnished or installed under this Section, during the construction and guarantee period.

1.11 ACCESS TO EQUIPMENT FOR MAINTENANCE

A. Install equipment, piping, and the like, to permit access for normal maintenance. Maintain easy access to filters, motors, and the like. Install such equipment and accessories to facilitate maintenance. Perform any relocation of pipes, and the like required to permit access at request of Engineer at no additional cost to Department.

B. Furnish and install access doors or panels in walls, floors, and ceilings to permit access to valves, strainers, traps, cleanouts, air vents, motors, and equipment and piping requiring service. Coordinate location of access doors with other trades as required.

C. Size access panels to allow inspection and removal of items served.

PART 2 - PRODUCTS

2.1 SANITARY MATERIALS

A. Soil, waste, area drains, roof drain line, and other drainage lines: Hubless service weight cast iron soil pipe and fittings, in conformance with City of Los Angeles Plumbing Code.

B. Exposed connections to fixtures, including countertop fixtures: 85 percent red brass seamless pipe, either chromium-plated or with 2 inch cover casing of chromium-plated brass tubing.

C. Vent piping:

1. Schedule 40, galvanized steel pipe and 125 pound galvanized cast-iron screwed fittings for lines smaller than 3 inch pipe, above ground, in conformance with ASTM A53/A53M.

2. Hubless service weight cast-iron soil pipe for underground lines and for lines 3-inch and larger pipe above ground, in conformance with RS Subsection 207-9.

D. Cleanouts:

1. Materials:

a. Above ground: Cast or ductile iron, City of Los Angeles Department of Building and Safety approved type.

b. Outside building: Extra heavy cast or ductile iron body non-corrosive City of Los Angeles Los Angeles Department of Building and Safety approved plastic plugs for tapered plugs. Provide brass for straight thread plugs with lead seal.

2. Provide access cover and frame where cleanouts occur in finished interior walls or ceilings.

3. In paved areas, use Smith Figure 4253, secured round top, spigot connection, set in concrete flush with paving.

4. In unpaved areas, use Smith Figure 4020 with extensions to finish grade.

5. On cast or ductile iron pipe above ground, use Smith Figure 4512, cleanout tee, lead seal bronze plug.

6. In interior floors, use Smith Figure 4020, flush with finish floor. Polished bronze round frame and cover. Provide vandal-proof screws where indicated or required.

7. In interior walls flush with the inside of wall, use Smith Figure 4530 cleanout tee, with bronze plug, and wall cover.

E. Roof Drainage Piping:

1. Underground or concealed in walls or above ceiling spaces shall be cast iron pipe and fittings as specified for soil and waste pipe.

2. Exposed shall be Schedule 40 galvanized steel pipe, with 125 pound galvanized cast iron screwed fittings.

## 2.2 WATER SUPPLY AND CONDENSATE DRAINS

A. Pipe for hot and cold water and condensate drains:

1. Underground: Type K hard copper in conformance with ASTM B88.

2. Above ground: Type L hard copper in conformance with ASTM B88.

3. Condensate drains: As indicated on Drawings.

B. Fittings: Wrought copper or cast red bronze, close grained and nonporous. Cast fittings permitted only in sizes and type not available in wrought fittings.

C. Nipples: Seamless 85 percent red brass pipe; shoulder type; no close nipples.

D. Exposed connections to fixtures: Seamless 85 percent red brass pipe, polished chromium-plated finish.

E. Solder:

1. Non lead solder for copper pipe that is City of Los Angeles Department of Building and Safety approved.

2. Sil-Fos silver alloy for underground copper pipe and for copper piping above ground having a continuous street main pressure of 100 pounds or more.

F. Flux shall be as recommended by manufacturer of the solder with which flux shall be used.

G. Couplings shall be same material and pressure rating as pipe on which couplings are used.

H. Unions:

1. For solder-joint piping, use wrought copper or cast bronze, close grained and nonporous, extra heavy type, 150 pounds working pressure, ground joint, individually tested by manufacturer.

2. For screwed-joint piping, use galvanized malleable iron, brass to iron seat, 250 pounds working pressure female pattern, ground joint.

I. Gate valves for 2 inch and smaller: Nibco/Scott No. S-136, union bonnet, non-rising stem, 150 pounds; 3 inch to 6 inch Jenkins 677-A O.S. & Y. bronze trim, flanged, 125 pounds.

J. Globe valves for 2 inch and smaller: Nibco/Scott No. S235, union bonnet, rising stem, 150 pounds; for 2-1/2-inch, Stockham Figure B-22, bronze, union bonnet, 150 pounds.

K. Check valves:

1. Two inch and smaller: Nibco/Scott No. S-413, 125-pounds

2. Two and one half -inch and larger: Nibco/Scott No. S-433, 150 pounds

L. Water meter: Neptune, Model T-10 female connections.

M. Backflow preventer: Reduced pressure principle, Claval RP 6L.

N. Pressure reducing valve and Y-strainer assembly: Wilkins Model 500 Y SBR.

O. Pressure relief valve: Poppet type Wilkins Model P 1000A.

2.3 PIPE HANGERS AND SUPPORTS

A. For vertical piping (except downspouts), use Grinnel Figure 262, not more than 10-feet apart and Grinnel Figure 261 riser clamp at each floor; Uni-Strut as approved by Engineer.

B. For horizontal piping, use Grinnel Figure 108 split pipe ring and Grinnel Figure 110R threaded rod socket, hung with steel rod from 2 inch by 2 inch by 3/16-inch steel angle clips screwed or bolted to concrete, framing, or blocking with bolt thread nut attached to rod end for hanger adjustment. (Hanger combination of Grinnel Figure 260 adjustable clevis Figure 248, steel rod with nuts and square head lag screws fastened to wood beams or blocking may be used.)

C. Fastening of hangers and supports to walls or slabs with redhead or other Engineer approved type inserts shall be acceptable.

2.4 SLEEVES

A. In stud walls, use 24 gauge galvanized iron or steel.

2.5 FLASHING FOR PIPE STACKS

A. Flashing fittings shall be Smith Figure 1740, galvanized.

B. Flashing shall extend 10 inches in every direction.

## 2.6 PLUMBING FIXTURES AND TRIMS

A. General:

1. Traps, strainers, and tailpieces at fixtures locations: Chromium plated, LA pattern.

2. Lavatories and Sinks: Supplies shall be chromium plated and rigid, Chicago or equal, screwed type angle compression stops with loose key square shank stems and lock shields extending beyond the stem.

3. Faucets: Polished chromium plated brass with die cast handles, removable trim units comprising wearing parts, quick compression type of close with the pressure.

B. Plumbing fixtures and accessories shall meet applicable requirements of Americans with Disabilities Act and conform with water conservation program of City of Los Angeles.

1. Water Closet (WC-1): Acorn 1675-W-1.28-FVN-HPS-ADA, wall mounted, flush through wall connectors. Color: Stainless Steel.

a. Carrier: J.R. Smith (No. 100 or No. 400 Series, short nipple).

b. Flush valve: Sloan 9611-1.28-AFD-MBPM.

2. Lavatory (L-1): Acorn Model No. 1652LRB-DMS-03-M. Color: Stainless Steel.

    a. Faucet: Included with Lavatory.

    b. Drain: Included with Lavatory.

    c. Carrier: J.R. Smith.

    d. Trap: Included with Lavatory.

    e. Supplies: Hot and cold water shall be specified in paragraph 2.6A of this Section.

3. Service Sink (MP-1): Acorn 1630-TFI.

    a. Faucet: American Standard Faucet 8354.112 with in-line Vaccume Breaker.

4. Sink:

    a. (S-1): DSW 260, Stainless steel

    b. (S-2): DSW 390, Stainless steel

C. Drinking Fountain: Elkay Slimline Soft Side Heavy Duty Bi-Level Fountain, Non-Filtered Non-Refrigerated Stainless, Model EGQM17C.

2.7 FLOOR AND ROOF DRAINS

A. Floor Drain (FD): J.R. Smith (800) 759-7474 Model No. 2005YB-H-P-02- A05, cast iron body, N.B. heel proof 6 inches square top, trap primer connection.

2.8 TRAP PRIMER

A. Trap primer (TP-1): Model M-500 as manufactured by MIFAB.

2.9 WATER HAMMER ARRESTERS

A. Water Hammer Arrester (WHA-1): Model WHB as manufactured by MIFAB with stainless steel elbow.

2.10 HOSE BIBBS

A. Hose Bibb (HB-1): Recessed hose bibb with lock door and vacuum breaker Model No. 8151 as manufactured by Acorn.

2.11 INSULATION-GENERAL

A. Insulate hot water piping with Manville(800)654-3103 Micro Lock 850-AP-T with pressure sensitive tape, 1 inch thick for sizes up to 2 inches; 1-1/2 inches thick for sizes 2-1/2 inches and above. Insulate fittings and valves with premolded "Zeston" PVC covers with factory supplied fiberglass inserts. Insulation shall conform to manufacturer's written instructions.

B. Non-recirculating water heaters, 50 gallons or less, shall be externally wrapped with vinyl lined R-12 insulation.

C. Cover exposed interior and exterior pipe insulation with 0.016 inch thick aluminum jacket.

D. Minimum requirement for insulation shall be as required by California State Energy Standard, Title 24. Insulation shall have City of Los Angeles Department of Building and Safety approval.

2.12 ELECTRIC HOT WATER HEATER

A. Unit shall be Dura-Power Model No. DEN52 as manufactured by A.O. Smith, glass lined, Underwriters Laboratories, Incorporated (UL) listed and approved with standard 3 year warranty. Unit shall meet Title 24, California Energy Standard.

B. Equipment and Fabrication:

1. Storage tank capacity: 50 gallons.

2. Individually mounted thermostat with high temperature cut-off switch.

3. Lined with a fused ceramic shield.

4. Rated at 5 kilowatts at 208/240V, 60 cycle, single phase.

5. Energy saving thermo-plastic drain valve.

6. Electric heating elements shall be medium watt density with zinc plated copper sheath.

7. Size: 55 inches high by 20 1/2 inches diameter.

C. Capacity shall be 26 GPH recovery at 90 degree rise.

D. Thermal Expansion Tank: 2 gallon capacity, Model No. WXTP-8, as manufactured by Zurn.

E. Combination temperature and pressure relief valve shall be resetting type construction approved by City of Los Angeles Department of Building and Safety. Install with temperature sensing element immersed in water within top 6 inches of the tank.

2.13 PIPE COVERING

A. Hot water supply pipe including in partitions and immediate drops to fixtures located underground or embedded in concrete, masonry, or plaster shall have required cover.

B. Pipe covering shall be Owens-Corning fiberglass heavy density pipe insulation, fiberglass 25 ASJ jacketed with a white presized glass cloth jacket having a pressure sealing lap adhesive; L.A. City Department of Building and Safety approved. Thermal resistance in the range of R=4.0 to 4.6 per inch of the thickness on a flat surface at a mean temperature of 75 degrees F; insulation thickness as recommended by the manufacturer, but minimum 1-inch, or as required by California State Energy Standard Title 24.

C. Covering of fittings, valves, and flanges shall be built-up fiberglass molded or insulating cement to a thickness equal to adjoining insulation or segmented pipe covering covered with reinforcing cloth in conformance with manufacturer's written instructions.

D. Finish shall be 6 ounces canvas jacket on insulated piping exposed to view in building and paint to match surroundings as specified in PAINTING FOR EXTERIOR IMPROVEMENTS Section.

PART 3 - EXECUTION

3.1 EXCAVATING, TRENCHING, AND BACKFILLING

A. Excavating:

1. Excavating, trenching, and backfilling required for installation of piping, plumbing Work, and other devices shall be in conformance with RS Subsection 306-1.

2. Make trenches parallel to footings not closer than 18-inches to the face of the footing and not below a plane having a downward slope of two horizontal to one vertical from a line 9 inches above the bottom of the footing.

3. Make trench width to provide space for connecting coupling.

4. Grade bottom of excavations to uniform slope as required by Building and Safety and to prevent formation of pockets in the pipe.

5. Should Contractor, in the course of trenching for underground piping encounter existing underground pipe or conduit, immediately stop trenching operation at that location and notify Engineer of such condition and do not proceed until further instructed by Engineer.

B. Protect excavations, and trenches against caving-in by shoring in conformance with EXCAVATION SAFETY REQUIREMENTS Section.

C. Backfilling:

1. Remove debris, trash, and form materials from the excavation and trenches prior to backfilling.

2. Do not backfill trenches until Engineer and City of Los Angeles Department of Building and Safety have approved the finish length of pipe, including fittings and valves.

3. Backfill material shall be clean earth material previously removed, or imported earth material free from large clods, stones, organic material or debris as approved by Engineer.

4. Backfill over pipe shall be washed sand or select fine backfill approved by Engineer for a thickness of not less than 12-inches above the finished section of pipe.

5. Place backfill in layers not exceeding 8 inches thickness, moisten to optimum moisture content and tamp until required 90 percent relative compaction is obtained.

6. Finish to elevation to provide for settlement and shrinkage.

7. Keep trenches and excavations free of water until backfilled.

8. Remove from Project Site excess excavated and imported material not used for backfill.

3.2 INSTALLATION OF PIPE

A. Pipe inside building shall be concealed within building walls, partitions, furred spaces, or ceilings, except in mechanical equipment room. Position pipes without springing or forcing.

B. Underground shall not be less than 2-feet below finished grade: Lay sewer pipe in separate trenches; space at a minimum of 12-inches from other service with a minimum of 18-inches from the footings or wall unless otherwise shown on Drawings; install in a straight line. Take precautions not to damage wrapped pipe. Set pipe parallel or at right angles to building or property lines. Set drain lines on a firm foundation or subgrade, to grade. Install less than 2 feet below finished grade only when pipe invert elevations indicate this condition on Drawings.

C. Soil and waste lines in buildings shall have joints in removable position at floor level. Where vertical lines go underground, bring cast iron pipe up to waste connection of each fixture.

D. Keep pipe openings closed during construction to prevent ingress of materials that may cause obstructions and damage.

E. Grade or Slope:

1. Sanitary piping and condensate lines shall be such that horizontal runs have a uniform fall of not less than 1/4-inch per foot unless otherwise shown on Drawings or as approved by Engineer.

2. Roof drains shall have a horizontal slope of 1/8-inch per foot unless otherwise shown on Drawings.

3. Vent piping shall have a grade to prevent accumulation of water and condensation.

F. Run draining pipe as straight as possible, with long radius turns, and offsets of angle of 45 degrees or less. Make changes in direction of piping with fittings unless specifically indicated otherwise on Drawings.

G. Locate cleanouts every 50 feet or as shown on Drawings at finished grade wall or floor, inside and outside of building with pipe extensions from horizontal runs installed with long turn radius or at an angle of 45 degrees or less.

H. Provide full-length sections of pipe for pipe lines wherever practical. Short sections with unnecessary couplings shall not be allowed.

I. Provide floor and ceiling plates where exposed pipes pass through walls, floors or ceilings; polished chromium-plated split-flange or one piece.

J. Separate hot and cold water by at least 6 inches on parallel runs.

K. Provide for expansion and contraction of piping to prevent damage to pipe insulation, or adjacent structures.

3.3 PIPE JOINTS

A. Install cast iron pipe with stainless steel couplings in conformance with manufacturer's written instructions and City of Los Angeles Codes. Provide temporary support or blocking as required for floor level connections to prevent damage to joint before floor is poured or laid. Make lines to line and grade without sags or bends.

B. Copper Tubing:

1. Cut tubing square using a tube cutter.

2. Remove burrs.

3. Clean end of pipe equal to depth of fittings and inside of fitting sand cloth, steel, wool, or steel brush to a bright finish.

4. Make up joint in conformance with recommendations of manufacturer of solder used.

5. Remove internal parts of valves prior to soldering.

C. Screwed Pipe:

1. Cut pipe with carborundum wheel or machine cutter.

2. Ream pipe to make bore at ends the same as within the pipe.

3. Cut threads with clean dies, full thickness of die.

4. Make up joint with pipe paste or teflon tape applied to male threads only.

D. Welded Joints:

1. Electric welding, procedure, and methods as recommended by the fitting manufacturer.

3.4 SLEEVES

A. Sleeves shall be required as follows:

1. In concrete slabs, place standard weight galvanized steel pipe in forms before concrete is placed.

2. In masonry, concrete walls, and concrete footing, use treated fiber rigid concrete sleeves or standard weight galvanized steel pipe set in forms before concrete is placed, built into masonry and as indicated on structural Drawings.

3. Clearance shall be 1/2-inch between sleeve and pipe or covered pipe. Extend sleeve in floor slabs 2 inches above finished floor and 4 inches above rough floor.

3.5 INSTALLATION OF VALVES AND FITTINGS

A. Install exposed plated or enameled connections to fixtures to avoid tool marks or threads showing at fittings.

B. Provide unions of same materials as fittings at each control valve, main shut off valve, and on connections to equipment.

C. Provide reducing fittings where changes in pipe sizes occur.

D. Do not use the following fittings unless approved by Engineer: screw or sand bushings; 90 degrees or 45 degrees street elbows, close nipples, long screws, bullhead tees, and special fittings.

E. Install valves on each branch line to one or more fixtures and on every underground branch line for complete control of the system. Place with stems horizontal wherever possible. Adjust, regulate, and pack glands before final acceptance.

F. Provide separate control by valves at each fixture on hot and cold water to permit repairs without interference with other fixtures. Hose bibbs shall have individual control valves except where otherwise indicated; adjacent to and either concealed or exposed as indicated by location of hose bibb.

G. Dielectric Couplings or Flanges shall be as follows:

1. Required where copper pipe is jointed to steel or iron pipe or equipment. Unions shall not be allowed for bronze valves in steel lines or for caulked joints between copper and cast iron drainage items.

2. Use couplings only on cold water installations.

3. Use flanges on installations above 140 degrees F and of material for temperatures involved.

H. Exposed toilet flush valves shall be rough and finish 4-3/4-inch to right of center of valve to center of wheel handle angle stop; 12-inches above top rim of bowl to center line of flush valve; with oscillating handle to left facing bowl.

I. Disassemble and lubricate flushometer valves with water pump grease and graphite before installation.

3.6 INSTALLATION OF HANGERS

A. Horizontal Pipe Hangers (Maximum Spacing):

1. Cast iron pipe shall have hangers at 5’-0” on centers, and at every joint and at each horizontal branch fitting, sway braced as required to stop horizontal movement.

2. Copper and steel pipe 2 inches and larger shall have hangers at10’-0” on centers.

3. Copper and steel pipe 1-1/2-inches and smaller shall have hangers at 6’ 0” on centers.

B. Provide sway bracing for horizontal piping where hangers are 18-inches long in conformance with details indicated on Drawings.

1. Locate lateral bracing at every third hanger.

2. Locate horizontal bracing at every turn of piping unless otherwise approved by Engineer.

C. Trapeze hangers may be used where several pipes run parallel to each other. Submit shop drawings showing construction and method of support to Engineer for approval prior to fabrication.

D. Install hangers outside the insulation with half-round galvanized sheet metal shields, not less than 18 gage thick by 8 inches long, to protect the insulation.

E. Provide anchoring on piping at flexible connections to equipment.

F. Isolate uninsulated piping from hangers, supports or structures with prefabricated isolators consisting of steel shell with corrosion-resistant coating and chemically treated hair-felt pad.

3.7 INSTALLATION OF ROOF FLASHING

A. Install flashing on bottom layer of roofing and embed in roofing.

B. Install flashing fitting after roofing is finished and approved by Engineer.

3.8 ACCESS PANEL

A. Provide access panels for valves or equipment behind walls of size required but in no case smaller than 8 inch by 8 inch openings; stainless steel, beveled edge frame; stainless steel cover secured with flush-head screws; polished finish; vandal-proof screws where indicated.

B. Provide access panels for valves, cleanouts or equipment located behind finish walls or ceilings 8 inches by 8 inches minimum opening, 16 gage steel frame; 14 gage steel door with concealed hinges arranged to open 180 degrees or to be removable and with Allen head locking device, bonderized and prime coated finish.

3.9 EQUIPMENT AND FIXTURE CONNECTIONS

A. Stub out connections to the locations and set symmetrical with the fixtures or equipment.

B. Schedule of fixture connections to individual branches unless otherwise directed by Engineer, shall be as indicated on Drawings. Pipe sizes shall be as indicated on Drawings

C. Hot and cold water supplies shall be center set faucets on lavatories set 4 inches on centers unless otherwise indicated.

D. Water headers serving water closets shall be the following minimum sizes and of the same size through their length:

1. For 1 or 2 flush valves: 1-1/2 inch

2. For 3 or 4 flush valves: 2 inch

3. For 5 to 8 valves: 2-1/2 inch

3.10 INSTALLATION OF FIXTURES

A. Support and attach fixtures to walls, ceilings, or floors in true right angles with floor and wall using adjustable fixture carrier. Set fixtures, supplies, traps, and trap outlets square with the wall, in line with fixture outlets, without offsets, angles, or bends.

B. Steel plate supports for wall hung fixtures shall be 3/8 inch thick by 6 inches wide steel plate recessed and lag screwed into wood studs or welded to steel studs and trapped for fixture bolts. Length and number of plates shall be as required to satisfactorily support the fixture to be installed. Plate shall be anchored to not less than 3 studs.

C. Provide anchor bolts for fixture attachment. Provide steel pipe sleeves for bolt adjustment and templates for holding anchor bolts.

D. Equipment, fixtures, and the like, shall be installed in strict conformance with manufacturer's written instructions.

E. Piping penetrating the roof shall be separated from other piping, and any roof equipment, by a minimum of 18 inches to ensure a proper pipe flashing installation.

F. Set fixtures at heights indicated on Drawings and in conformance with Americans with Disabilities Act requirements.

G. Grout joint between fixture and wall or floor with silicone sealant to provide a smooth, even, and watertight seal as specified in JOINT SEALANTS Section.

H. Watertight joints for drainage connections to fixtures shall be made in conformance with City of Los Angeles Plumbing Code.

I. Install fixtures complete with necessary trim and stops, chromium plated brass, including tailpieces, traps, and escutcheons.

J. Connections to fixtures shall be in conformance with Code requirements except as exceeded in this Section or on Drawings, and in no case smaller than the supply stop size. Minimum waste sizes shall be 4 inches for water closets and 2 inches for lavatories.

K. Clean equipment, fixtures, trim and exposed piping, of cement, plaster, grease and oil spots and wipe surfaces, scrape clean cracks and corners.

L. Polish exposed chromium-plated or nickel-plated surfaces, with clean cloth.

M. Leave Work in a neat, clean condition, ready for use.

3.11 BACK SIPHONAGE PROTECTION

A. Protect water supplies of plumbing fixtures against back siphonage in the event of a vacuum in the piping system.

B. Locate discharge outlets of supply faucets for lavatories and sinks to clear the top of overflow rim by at least 1 inch.

C. Equip toilet flush valves with vacuum breakers. Install at the height required by City of Los Angeles Plumbing Code.

D. Backflow prevention devices shall be approved by City of Los Angeles Department of Building and Safety.

3.12 WATER HAMMER ARRESTERS

A. Provide in hot and cold water headers serving fixtures except drinking fountains. Install before last fixture being served by header and at hose bibbs.

B. Size and installation shall be in conformance with City of Los Angeles Plumbing Code.

C. Provide access for hammer arresters.

3.13 IDENTIFICATION OF PIPE LINES

A. Provide identification for pipe lines by means of colored labels and with directional arrows where indicated on schedule.

B. Identification signs shall be waterproof plastic material.

C. Minimum size shall be 1-1/8-inch by 7 inches.

D. Colors:

1. Letters shall be white on red background.

E. Locations:

1. Exposed unfurred pipes, whether insulated or not (including heater rooms, attic and ceiling spaces, mechanical equipment areas and occupied areas); except that labels may be omitted from piping where the use is obvious, due to its connection to fixtures (such as faucets, water closets, and the like.) and where the appearance would be objectionable in finished rooms; as approved Engineer.

2. Near each valve and branch connection.

3. Wherever piping emerges or disappears from view when viewed from floor of room in which installed.

4. At points not more than 50 feet apart between labels required.

| Contents of Type of Pipe | Legend | Background Color |
|---|---|---|
| | | |
| Domestic Cold Water | # Cold Water | Green |
| Domestic Hot Water | # Hot Water | Yellow |
| Condensate Drain | Drain Water | Green |
| Soil or Waste | Sanitary Sewer | Green |
| Sanitary Vent | Vent | Green |

F. Provide directional arrows.

3.14 IDENTIFICATION OF VALVES

A. Make identification of shut-off and control valves by means of 18-gage brass discs 1 1/2-inch diameter and fastened thereto with brass S-hooks. Mark each disc so as to readily indicate the valve function. Mount 2 type written charts on masonite board and cover with glass or heavy plastic sheet. Chart to show valve number, location and function for each system. Mount on metal frame and deliver to Engineer.

3.15 EMERGENCY REPAIRS

A. Department reserves the right to make emergency repairs as required to keep equipment in operation, without voiding Contractor's warranty.

3.16 CLEANING AND DISINFECTING OF WATER SYSTEM

A. Clean pipe inside by wire brush or other means to remove scale, sand, cutting chips, and the like prior to installation. Remove loose material by compressed air. After construction (prior to testing), flush piping with clean water to remove construction debris.

B. Disinfecting shall be required for each hot water, cold water, and drinking water system, water fixtures that have been connected and are ready for operation.

C. Disinfect that portion of the water system installed in this Project serving domestic needs, including any existing waterlines, if necessary, at either end of the system back to the first available valves. Conform to AWWA C651 for disinfecting water mains. Furnish, install, and remove blind flanges, valves, pressure connections, chlorination inlet point(s) required to test and chlorinate the water system. Refer to WATER DISTRIBUTION Section for additional requirements.

D. Submit written report of the test to Engineer showing:

1. Name and location of Project and date sample was obtained.
2. Coliform-aerogenes organisms are negative.
3. Total plate count is less than 100 bacteria per cubic centimeter.
4. Water is safe to use.
5. Test shall be conducted by Los Angeles County Health Department.

E. Cost of the materials, equipment, and application, including water charges and laboratory fees shall be at Contractor's sole cost and expense.

3.17 TESTING

A. Hydrostatically test the entire plumbing, drainage, and venting systems in conformance with City of Los Angeles Plumbing Code.

B. Water test water piping at 150 psi for not less than 15 minutes prior to inspection.

C. Test drainage and vent systems at not less than 10 foot head of water for not less than 15 minutes prior to inspection.

D. Test building sewer by plugging the end of the building sewer at its points of connection with the public sewer and completely filled with water from the lowest to the highest point thereof. The building sewer shall be completely filled not less than 15 minutes prior to inspection.

E. Tests shall be witnessed and inspected by City of Los Angeles Building and Safety inspector and Engineer. Notify Engineer and Building and Safety inspector 2 working days prior to start of testing.

F. Should any piece of system or Work fail in any of these tests, it shall be removed immediately and replaced by new materials at sole cost and expense of Contractor and that portion of Work shall be retested at Contractor's sole cost and expense.

G. Submit copies of test results to Engineer.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Support and attachment components for equipment, piping, and other HVAC/hydronic Work

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

B. Section 23 05 48 - Vibration and Seismic Controls for HVAC

C. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

E. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.

F. MFMA-4 - Metal Framing Standards Publication.

G. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation.

H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

## 1.5 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.

2. Coordinate Work with other trades to provide additional framing and materials required for installation.

3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.

4. Coordinate the arrangement of supports with ductwork, piping, equipment, and other potential conflicts installed under other sections or by others.

5. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with Work.

B. Sequencing:

1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in conformance with CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

## 1.6 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for metal channel (strut) framing systems, non-penetrating rooftop supports, post-installed concrete and masonry anchors, and thermal insulated pipe supports.

B. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.

1. Application of protective inserts, saddles, and shields at pipe hangers for each type of insulation and hanger.

C. Evaluation Reports: For products specified as requiring evaluation and recognition by ICC Evaluation Service, LLC. (ICC-ES), provide current ICC-ES evaluation reports upon request.

D. Installer's Qualifications: Include evidence of compliance with specified requirements.

E. Manufacturer's Written Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.7 QUALITY ASSURANCE

A. Comply with applicable building code.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Installer Qualifications for Powder-Actuated Fasteners (when specified): Certified by fastener system manufacturer with current operator's license.

D. Installer Qualifications for Field-Welding: As specified in METAL FABRICATIONS Section.

E. Product Listing Organization Qualifications: An organization recognized by Occupational Safety and Health Administration (OSHA) as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in conformance with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:

1. Comply with MSS SP-58.

2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.

3. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.

4. Where support and attachment component types and sizes are not indicated, select in conformance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 2. Include consideration for vibration, equipment operation, and shock loads where applicable.

5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.

6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.

    a. Indoor Dry Locations: Use zinc-plated steel.

    b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel or stainless steel unless otherwise indicated.

    c. Zinc-Plated Steel: Electroplated in conformance with ASTM B633.

    d. Galvanized Steel: Hot-dip galvanized after fabrication in conformance with ASTM A123/A123M or ASTM A153/A153M.

B. Materials for Metal Fabricated Supports: Comply with METAL FABRICATIONS Section.

C. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.

1. Manufacturers:

    a. Cooper B-Line, a division of Eaton Corporation

    b. Thomas & Betts Corporation

    c. Unistrut, a brand of Atkore International Inc

    d. Source Limitations: Furnish channels (struts) and associated fittings, accessories, and hardware produced by a single manufacturer.

2. Provide factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.

3. Comply with MFMA-4.
4. Channel Material:
    a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
    b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
5. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch.
6. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.

D. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.

1. Minimum Size, Unless Otherwise Indicated or Required:
    a. Equipment Supports: 1/2 inch diameter.
    b. Piping up to 1 inch nominal: 1/4 inch diameter.
    c. Piping larger than 1 inch nominal: 3/8 inch diameter.
    d. Trapeze Support for Multiple Pipes: 3/8 inch diameter.

E. Thermal Insulated Pipe Supports:

1. Manufacturers:
    a. KB Enterprises.
2. General Construction and Requirements:
    a. Insulated pipe supports to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
    b. Surface Burning Characteristics: Flame spread index/smoke developed index of 5/30, maximum, when tested in conformance with ASTM E84 or UL 723.
    c. Pipe supports to be provided for nominally sized, 1/2 inch to 30 inch iron pipes.
    d. Insulation inserts to consist of polyisocyanurate (urethane) insulation surrounded by a 360 degree, PVC jacketing.

3. PVC Jacket:

    a. Pipe insulation protection shields to be provided with a ball bearing hinge and locking seam.

    b. Minimum Service Temperature: Minus 40 degrees Fahrenheit (F).

    c. Maximum Service Temperature: 180 degrees F.

    d. Moisture Vapor Transmission: 0.0071 perm inch, when tested in conformance with ASTM E96/E96M.

    e. Thickness: 60 mil.

    f. Connections: Brush on welding adhesive.

4. Pipe insulation protection shields to be provided at the hanger points and guide locations on pipes requiring insulation as indicated on Drawings.

F. Anchors and Fasteners:

1. Manufacturers - Mechanical Anchors:

    a. Hilti, Inc.

    b. Powers Fasteners, Inc.

    c. Simpson Strong-Tie Company Inc.

2. Manufacturers - Powder-Actuated Fastening Systems:

    a. Hilti, Inc.

    b. Powers Fasteners, Inc.

    c. Simpson Strong-Tie Company Inc.

3. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

4. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.

5. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.

6. Hollow Masonry: Use toggle bolts.

7. Hollow Stud Walls: Use toggle bolts.

8. Steel: Use beam clamps, machine bolts, or welded threaded studs.
9. Sheet Metal: Use sheet metal screws.
10. Plastic and lead anchors are not permitted.
11. Powder-actuated fasteners are not permitted.
    a. Where approved by the Engineer.
    b. Use only threaded studs; do not use pins.
12. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
    a. Comply with MFMA-4.
    b. Channel Material: Use galvanized steel.
    c. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch minimum base metal thickness.
    d. Manufacturer: Same as manufacturer of metal channel (strut) framing system.
13. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC. (ICC-ES) for compliance with applicable building code.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

### 3.2 INSTALLATION

A. Install products in conformance with manufacturer's written instructions.

B. Install anchors and fasteners in conformance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

C. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.

D. Unless specifically indicated or approved by the Engineer, do not provide support from suspended ceiling support system or ceiling grid.

E. Unless specifically indicated or approved by the Engineer, do not provide support from roof deck.

F. Do not penetrate or otherwise notch or cut structural members without approval of the Structural Engineer.

G. Field-Welding (where approved by the Engineer): Comply with METAL FABRICATIONS Section.

H. Provide thermal insulated pipe supports complete with hangers and accessories. Install thermal insulated pipe supports during the installation of the piping system.

I. Equipment Support and Attachment:

1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.

2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.

3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.

4. Unless otherwise indicated, mount floor-mounted equipment on properly sized 3 inch high concrete pad constructed in conformance with CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

J. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.

K. Secure fasteners in conformance with manufacturer's written instructions for torque settings.

L. Remove temporary supports.

## 3.3 FIELD QUALITY CONTROL

A. Inspect support and attachment components for damage and defects.

B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

C. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Vibration isolators

B. Seismic restraints for suspended components and equipment

1.2 RELATED SECTIONS

A. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment

B. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

B. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications.

C. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems.

1.5 SUBMITTALS

A. Product Data:

1. Provide manufacturer's product literature documenting compliance with PART 2 - PRODUCTS.

2. Include seismic rating documentation for each isolator and restraint component accounting for horizontal, vertical, and combined loads.

B. Shop Drawings:

1. Provide schedule of vibration isolator type with location and load on each.

2. Fully dimensioned fabrication drawings and installation details for vibration isolation bases, member sizes, attachments to isolators, and supported equipment.

3. Include auxiliary motor slide bases and rails, base weights, inertia bases, concrete weights, equipment static loads, support points, vibration isolators, and detailed layout of isolator location and orientation with static and dynamic load on each isolator.

4. Include selections from prescriptive design tables that indicate compliance with the applicable building code and the vibration isolator manufacturer's requirements.

5. Clearly indicate the load and capacity assumptions selected. Include copies of any calculations.

6. Include the calculations that indicate compliance with the applicable building code for seismic controls and the vibration isolator manufacturer's requirements.

7. Include the seal of the Professional Structural Engineer registered in State of California in which Project is located, on drawings and calculations which at a minimum include the following:

    a. Seismic Restraint Details: Detailed drawings of seismic restraints and snubbers including anchorage details that indicate quantity, diameter, and depth of penetration, edge distance, and spacing of anchors.

    b. Equipment Seismic Qualification Certification: Certification by the manufacturer or responsible party that each piece of equipment provided shall withstand seismic force levels as specified in the applicable building code for seismic controls.

        1) Basis for Certification: Indicate whether the withstand certification is based on actual testing of assembled components, on calculations, or on historic data.

        2) Indicate equipment to be sufficiently durable to resist design forces and remain functional after the seismic event.

    c. Dimensioned outline drawings of equipment identifying center of gravity, locations, and provisions for mounting and anchorage.

    d. Detailed description of the equipment anchorage devices on which the certifications are based.

    e. Statement of Special Inspections: Prepared by the registered design professional in responsible charge.

C. Manufacturer's Written Instructions: Indicate installation instructions with special procedures and setting dimensions.

1.6 QUALITY ASSURANCE

A. Comply with applicable building code.

B. Perform design and installation in conformance with applicable codes.

C. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and registered and licensed in State of California.

D. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 3 years of documented experience.

1. Member of Vibration Isolation and Seismic Control Manufacturers Association (VISCMA).

E. Installer Qualifications: Company specializing in performing Work of this section with minimum 5 years of experience.

F. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Mason Industries, Inc.

B. Vibrex

C. Kinetics Noise Control, Inc.

2.2 PERFORMANCE REQUIREMENTS

A. General:

1. Vibration isolators, base frames and inertia bases to conform to uniform deflection and stability requirements under operating loads.

2. Steel springs to function without undue stress or overloading.

3. Steel springs to operate in the linear portion of the load versus deflection curve over deflection range of not less than 50 percent above specified deflection.

4. Lateral to vertical stiffness ratio to not exceed 0.08 with spring deflection at minimum 75 percent of specified deflection.

5. Equipment mounted on vibration isolated bases to have minimum operating clearance of 2 inches between the base and floor or support beneath unless noted otherwise.

## 2.3 VIBRATION ISOLATORS

A. Non-Seismic Type:

1. Elastomeric-Fiber Glass Pads:

   a. Configuration: Flat or molded.

   b. Thickness: 0.25 inch minimum.

   c. Assembly: Single or multiple layers using bonded, galvanized sheet metal separation plate between each layer with load plate providing evenly distributed load over pad surface.

2. Elastomeric Mounts:

   a. Material: Oil, ozone, and oxidant resistant compounds.

   b. Assembly: Encapsulated load transfer plate bolted to equipment and base plate with anchor hole bolted to supporting structure.

3. Steel Springs:

   a. Assembly: Freestanding, laterally stable without housing.

   b. Leveling Device: Rigidly connected to equipment or frame.

4. Restrained Steel Springs:

   a. Housing: Rigid blocking during rigging prevents equipment installed and operating height from changing during temporary weight reduction.

   b. Equipment Wind Loading: Adequate means for fastening isolator top to equipment and isolator base plate to supporting structure.

5. Elastomeric Hangers:

    a. Housing: Steel construction containing elastomeric isolation element to prevent rod contact with housing and short-circuiting of isolating function.

    b. Incorporate steel load distribution plate sandwiching elastomeric element to housing.

6. Spring Hanger:

    a. Housing: Steel construction containing stable steel spring and integral elastomeric element preventing metal to metal contact.

    b. Bottom Opening: Sized to allow plus or minus 15 degrees rod misalignment.

7. Combination Elastomeric-Spring Hanger:

    a. Housing: Steel construction containing stable steel spring with elastomeric element in series isolating upper connection of hanger box to building structure.

    b. Bottom Opening: Sized to allow plus or minus 15 degrees rod misalignment.

B. Seismic Type:

1. Coil Springs Consisting of Single Elements:

    a. Housing: Manufactured from cast iron material.

    b. Ductile Material: Designed and rated for seismic applications.

    c. Spring: Restrained by housing without significant degradation of vibration isolation capabilities during normal equipment operating conditions.

    d. Resilient Snubbing Grommet System: Incorporated and designed with clearances of no more than 0.25 inch in any direction preventing direct metal-to-metal contact between supported member and fixed restraint housing.

    e. Resilient Pad: Located in series with spring.

f. Coil Springs: Color coded elements to have a lateral stiffness greater than 0.8 times the rated vertical stiffness with 50 percent overload capacity.

g. Finish: Suitable for the application.

2. Directional Elastomeric:

a. Material: Molded from oil, ozone, and oxidant resistant compounds.

b. Operating Parameters: Designed to operate within the isolator strain limits providing maximum performance and service life.

c. Attachment Method: Encapsulated load transfer plate bolted to equipment and base plate with anchor hole bolted to supporting structure.

d. Rating: Cast iron and aluminum housings rated for seismic restraint applications.

e. Minimum Operating Static Deflections: Deflections indicated in project documents are not to exceed published load capacities.

## 2.4 SEISMIC RESTRAINTS FOR SUSPENDED COMPONENTS AND EQUIPMENT

A. Comply with:

1. ASHRAE (HVACA)

2. SMACNA (SRM)

B. Cable Restraints:

1. Wire Rope: Steel wire strand cables sized to resist seismic loads in lateral directions.

2. Protective Thimbles: Eliminates potential for dynamic cable wear and strand breakage.

3. Size: Based on the lesser of cable capacity or anchor load taking into account bracket geometry.

4. Connections:

a. Use overlapping wire rope U clips, cable clamping bolts, swaged sleeves, or seismically rated tool-less wedge insert lock connectors.

b. Internally brace clevis hanger bracket cross bolt to prevent deformation.

5. Vertical Suspension Rods: Attach required bracing of sufficient strength to prevent rod buckling from vertical compression forces utilizing series of attachment clips.

C. Rigid Restraints:

1. Structural Element: Sized to resist seismic loads in lateral directions and carry both compressive and tensile loading.

2. Size: Based on the lesser of cable capacity or anchor load taking into account bracket geometry.

3. Connections: Internally brace clevis hanger bracket cross bolt to prevent deformation.

4. Static Support System: Anchorage capable of carrying additional tension loads generated by the vertical component of the rigid brace compression which is additive to any static load requirements on the system.

5. Vertical Suspension Rods: Attached required bracing of sufficient strength to prevent rod buckling from vertical compression forces utilizing series of attachment clips.

## PART 3 - EXECUTION

### 3.1 INSTALLATION - GENERAL

A. Install in conformance with manufacturer's written instructions.

B. On closed spring isolators, adjust so side stabilizers are clear under normal operating conditions.

C. Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height. When full load is applied, adjust isolators to load to allow shim removal.

D. Support piping connections to equipment mounted on isolators using isolators or resilient hangers for scheduled distance.

1. Up to 4 Inches Pipe Size: First 3 points of support.

2. Select three hangers closest to vibration source for minimum 1.0 inch static deflection or static deflection of isolated equipment. Select remaining isolators for minimum 1.0 inch static deflection or 1/2 static deflection of isolated equipment.

3.2 INSTALLATION - SEISMIC

A. Comply with:

1. ASHRAE (HVACA) Handbook - HVAC Applications ASHRAE (HVACA)

2. SMACNA (SRM)

B. Suspended Mechanical Equipment:

1. Provide supports and bracing to resist seismic design force in any direction.

2. Provide flexible connections between equipment and interconnected piping.

3. Brace equipment hung from spring mounts using cable or other bracing that shall not transmit vibration to the structure.

4. Use of proprietary restraint systems with a certificate of compliance, verified and listed by an accredited inspection body is acceptable (pending shop drawing approval), as an alternative to project specific seismic bracing design.

C. Wall mounted Mechanical Equipment:

1. Provide support and bracing to resist seismic design force in any direction.

2. Install backing plates or blocking as required to deliver load to primary wall framing members.

3. Anchoring to gypsum wallboard, plaster, or other wall finish that has not been engineered to resist imposed loads is not permitted.

D. Piping:

1. Provide seismic bracing in conformance ASCE 7.

2. Provide supports, braces, and anchors to resist gravity and seismic design forces.

3. Provide flexible connections between floor mounted equipment and suspended piping; between unbraced piping and restrained suspended items; as required for thermal movement; at building separations and seismic joints; and wherever relative differential movements could damage pipe in an earthquake.

4. Brace resiliently supported pipe with cable bracing or alternate means designed to prevent transmission of vibrations and noise to the structure.

5. Brace every run 5.0 feet or more in length with 2 transverse and 1 longitudinal bracing locations.

6. Pipes and Connections Constructed of Ductile Materials (copper, ductile iron, steel, or aluminum and brazed, welded or screwed connections):

    a. Provide transverse bracing at spacing not more than 40.0 feet on center.

    b. Provide longitudinal bracing at spacing not more than 80.0 feet on center.

7. Pipes and Connections Constructed of Non Ductile Materials (cast iron, no-hub, plastic or non-UL listed grooved coupling pipe):

    a. Provide transverse bracing at spacing not more than 20.0 feet on center.

    b. Provide longitudinal bracing at spacing not more than 40.0 feet on center.

8. Provide lateral restraint for risers at not more than 30 feet on center or as required for horizontal runs, whichever is less.

9. Piping Explicitly Exempt from Seismic Bracing Requirements:

    a. Provide flexible connections between piping and connected equipment.

    b. Install piping consistent with ASCE 7, such that swinging of the pipes shall not cause damaging impact with adjacent components, finishes, or structural framing while maintaining clear horizontal distance of 67 percent of the hanger length between subject components.

    c. Provide swing restraints as required to control potential impact due to limited space between subject components.

10. Use of proprietary restraint systems with a certificate of compliance, verified and listed by an accredited inspection body is acceptable (pending shop drawing approval), as an alternative to project specific seismic bracing design.

E. Ductwork:

1. Provide seismic bracing for ducts with cross sectional area greater than 6 sq ft (independent of duct contents).

2. Provide seismic bracing for ducts containing hazardous materials.

3. Provide supports, braces, and anchors to resist gravity and seismic design forces.

4. Install ducts and duct risers designed to accommodate interstory drift.

5. Independently support in-line devices weighing more than 20 pounds.

6. Independently support and brace in-line devices weighing more than 75 pounds.

7. Provide unbraced piping attached to braced in-line equipment with adequate flexibility to accommodate differential displacements.

8. Positively attach dampers, louvers, diffusers and similar appurtenances to ductwork with mechanical fasteners.

9. Install duct supports designed to resist not less than 150 percent of the duct weight.

10. The use of power driven fasteners is prohibited in the hanging of ducts weighing over 10 pounds per lineal foot for seismic design categories D, E, and F.

## 3.3 FIELD QUALITY CONTROL

A. Inspect isolated equipment after installation and submit report. Include static deflections.

## 3.4 SCHEDULE

A. Pipe Isolation Schedule:

1. 1 Inch Pipe Size: Isolate 120 diameters from equipment.

2. 2 Inch Pipe Size: Isolate 90 diameters from equipment.

B. Equipment Isolation Schedule:

1. Suspended Air Cooled Condensing Units:

   a. Base: None. Suspended from concrete structure above.

   b. Isolator Type: Open spring isolators.

   c. Isoltator Deflection: per 2 inches.

2. Computer Room Air Conditioning Units:

   a. Base: None. Suspended from concrete structure above.

   b. Isolator Type: Open spring isolators.

3. Exhaust Fan:

   a. Base: None. Suspended from concrete structure above.

   b. Isolator Type: Open spring isolators.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Nameplates

B. Tags

C. Adhesive-backed duct markers

D. Pipe markers

1.2 RELATED SECTIONS

A. Section 09 96 00 - High-Performance Coatings

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASME A13.1 - Scheme for the Identification of Piping Systems.

B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials.

1.5 SUBMITTALS

A. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

C. Product Data: Provide manufacturers catalog literature for each product required.

D. Manufacturer's Written Instructions for Installation: Indicate special procedures and installation.

E. Project Record Documents: Record actual locations of tagged valves.

PART 2 - PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

A. Fan Coil Units: Nameplates.

B. Condensing Units: Nameplates.

C. Automatic Controls: Tags; name per control schematic.

D. Exhaust Fans: Nameplates.

E. Ductwork: Duct Marker Labels.

F. Instrumentation: Tags.

G. Major Control Components: Nameplates.

H. Piping: Pipe Markers.

I. Small-sized Equipment: Tags.

J. Thermostats: Nameplates.

2.2 NAMEPLATES

A. Manufacturers:

1. Advanced Graphic Engraving, www.advancedgraphicengraving.com.

2. Brimar Industries, Inc. www.brimar.com.

B. Plastic: Conform with ASTM D709.

2.3 TAGS

A. Manufacturers:

1. Advanced Graphic Engraving, www.advancedgraphicengraving.com.

2. Brady Corporation, www.bradyid.com.

B. Plastic Tags: Laminated 3-layer plastic with engraved letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.

C. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

2.4 ADHESIVE-BACKED DUCT MARKERS

A. Manufacturers:

1. Brimar Industries, Inc. www.brimar.com.

2. Craftmark Identification Systems, www.craftmarkid.com.

B. Material: High gloss acrylic adhesive-backed vinyl film 0.0032 inch; printed with UV and chemical resistant inks.

C. Style: Individual Label.

2.5 PIPE MARKERS

A. Manufacturers:

1. Brady Corporation, www.bradyid.com.

2. Brimar Industries, Inc. www.pipemarker.com.

B. Color: Conform to ASME A13.1.

C. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in conformance with manufacturer's written instructions.

D. Install plastic tape pipe markers complete around pipe in conformance with manufacturer's written instructions.

E. Use tags on piping 3/4 inch diameter and smaller.

1. Identify service, flow direction, and pressure.

2. Install in clear view and align with axis of piping.

3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

F. Install ductwork with plastic nameplates. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

3.3 SCHEDULE

A. Mechanical Equipment:

1. Identification: Nameplate.

2. Background: Red.

3. Lettering: White.

a. Size: 1/2 inch.

B. Exhaust Air Ducts:

1. Identification: Duct Marker Label.

2. Background: Yellow.

3. Lettering: Black.

a. Size: 1-1/2 inch minimum.

C. Supply Air, Return Air Ducts:

1. Identification: Duct Marker Label.

2. Background: Blue.

3. Lettering: White.

a. Size: 1-1/2 inch minimum.

D. Refrigerant Piping:

1. Identification: Pipe Marker.
2. Background: Yellow.
3. Lettering: Black.
    a. Size: 1-1/2 inch.

E. Automatic Controls, Instrumentation, and Small-Size Equipment:

1. Identification: Tag; name per control schematic.
2. Background: Natural.
3. Lettering: Black.
    a. Size: 1/2 inch.

F. Thermostats:

1. Identification: Nameplate; name per zone number.
2. Background: White.
3. Lettering: Black.
    a. Size: 1/4 inch.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Testing, adjustment, and balancing of air systems.

B. Measurement of final operating condition of HVAC systems.

C. Sound measurement of equipment operating conditions.

D. Vibration measurement of equipment operating conditions.

E. Commissioning activities.

1.2 RELATED SECTIONS

A. Section 23 81 26.13 - Small-Capacity Split-System Air-Conditioners

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition.

B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems.

C. NEBB (TAB) - Procedural Standard for Testing, Adjusting and Balancing of Environmental Systems.

D. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing.

1.5 SUBMITTALS

A. Installer Qualifications: Submit name of adjusting and balancing agency and Testing, Adjusting, and Balancing (TAB) supervisor for approval.

B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.

1. Submit to Engineer.
2. Submit to the Commissioning Authority.
3. Submit 6 weeks prior to starting the testing, adjusting, and balancing Work.
4. Include certification that the plan developer has reviewed Contract documents, the equipment and systems, and the control system with Engineer and other installers to sufficiently understand the design intent for each system.
5. Include at least the following in the plan:
    a. Preface: An explanation of the intended use of the control system.
    b. List of air flow, sound level, system capacity, and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
    c. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted, and balanced with the data cells to be gathered for each.
    d. Identification and types of measurement instruments to be used and their most recent calibration date.
    e. Discussion of what notations and markings shall be made on the duct and piping drawings during the process.
    f. Final test report forms to be used.
    g. Detailed step-by-step procedures for TAB Work for each system and issue, including:
        1) Terminal flow calibration (for each terminal type)
        2) Diffuser proportioning
        3) Branch/submain proportioning
        4) Total flow calculations

5) Rechecking

h. Expected problems and solutions, and the like.

i. Details of how TOTAL flow shall be determined; for example:

1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of terminals, supply (SA), and return air (RA) pitot traverse, SA or RA flow stations.

j. Specific procedures that shall ensure that air systems are operating at the lowest possible pressures and methods to verify this.

k. Confirmation of understanding of the outside air ventilation criteria under all conditions.

l. Method of verifying and setting minimum outside air flow rate shall be verified and set and for what level (total building, zone, and the like).

m. Method of checking building static, exhaust fan, and relief damper capacity.

n. Proposed selection points for sound measurements and sound measurement methods.

o. Methods for making coil or other system plant capacity measurements, if specified.

p. Time schedule for deferred or seasonal TAB Work, if specified.

q. False loading of systems to complete TAB Work for LAN Room.

r. Exhaust fan balancing and capacity verifications, including any required room pressure differentials.

s. Procedures for field technician logs of discrepancies, deficient or uncompleted Work by others, contract interpretation requests and lists of completed tests (scope and frequency).

t. Procedures for formal progress reports, including scope and frequency.

u. Procedures for formal deficiency reports, including scope, frequency and distribution.

C. Field Logs: Submit at least twice a week to the Commissioning Authority.

D. Control System Coordination Reports: Communicate in writing to the controls installer setpoint and parameter changes made or problems and discrepancies identified during TAB that affect, or could affect, the control system setup and operation.

E. Progress Reports.

F. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

1. Submit to the Commissioning Authority within 2 weeks after completion of testing, adjusting, and balancing.

2. Revise TAB plan to reflect actual procedures and submit as part of final report.

3. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Engineer and for inclusion in operating and maintenance manuals.

4. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.

5. Include actual instrument list, with manufacturer name, serial number, and date of calibration.

6. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.

7. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

8. Include the following on the title page of each report:

a. Name of Testing, Adjusting, and Balancing Agency.

b. Address of Testing, Adjusting, and Balancing Agency.

c. Telephone number of Testing, Adjusting, and Balancing Agency.

d. Project name

e. Project location

f. Project Engineer

g. Project Contractor

h. Project altitude

i. Report date

G. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Perform total system balance in conformance with 1 of the following:

1. AABC (NSTSB)

2. ASHRAE Std 111

3. SMACNA (TAB)

4. Maintain at least 1 copy of the standard to be used at Project Site at all times.

B. Begin Work after completion of systems to be tested, adjusted, or balanced and complete Work prior to Substantial Completion of Project.

C. Where HVAC systems and components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.

D. TAB Agency Qualifications:

1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.

2. Having minimum of 3 years documented experience.

3. Certified by one of the following:

a. Associated Air Balance Council (AABC) upon completion submit AABC National Performance Guaranty.

b. National Environmental Balancing Bureau (NEBB) NEBB (TAB)

E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

F. TAB Supervisor Qualifications: Professional Engineer licensed in the State of California.

3.2 EXAMINATION

A. Verify that systems are complete and operable before commencing Work. Ensure the following conditions:

1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire and volume dampers are in place and open.
8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.
12. Hydronic systems are flushed, filled, and vented.
13. Pumps are rotating correctly.
14. Proper strainer baskets are clean and in place.
15. Service and balance valves are open.

B. Submit field reports. Report defects and deficiencies that shall or could prevent proper system balance.

C. Beginning of Work means acceptance of existing conditions.

## 3.3 PREPARATION

A. Hold a pre-balancing meeting at least 1 week prior to starting TAB Work.

1. Require attendance by installers whose Work shall be tested, adjusted, or balanced.

B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Engineer to facilitate spot checks during testing.

C. Provide additional balancing devices as required.

## 3.4 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

## 3.5 RECORDING AND ADJUSTING

A. Field Logs: Maintain written logs including:

1. Running log of events and issues

2. Discrepancies, deficient or uncompleted Work by others

3. Contract interpretation requests

4. Lists of completed tests

B. Ensure recorded data represents actual measured or observed conditions.

C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.

E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

G. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Department.

H. Check and adjust systems approximately 6 months after final acceptance and submit report.

3.6 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

I. Adjust supply air and exhaust air dampers for design conditions.

J. Measure temperature conditions across return air and exhaust dampers to check leakage.

## 3.7 COMMISSIONING

A. Perform prerequisites prior to starting commissioning activities.

B. Fill out Prefunctional Checklists for:

1. Air side systems

2. Water side systems

C. Furnish to the Commissioning Authority, upon request, any data gathered but not shown in the final TAB report.

D. Re-check total airflow rates for 100 percent of the air handling systems plus a random sample equivalent to 25 percent of the final TAB report data as directed by Commissioning Authority.

1. Original TAB agency shall execute the re-checks, witnessed by the Commissioning Authority.

2. Use the same test instruments as used in the original TAB Work.

3. Failure of more than 10 percent of the re-checked items of a given system shall result in the rejection of the system TAB report; rebalance the system, provide a new system TAB report, and repeat random re-checks.

4. For purposes of re-check, failure is defined as follows:

a. Air Flow of Supply and Return: Deviation of more than 10 percent of instrument reading.

b. Temperatures: Deviation of more than 1 degree Fahrenheit (F).

c. Air Pressures: Deviation of more than 10 percent of full scale of test instrument reading.

d. Sound Pressures: Deviation of more than 3 decibels, with consideration for variations in background noise.

5. For purposes of re-check, a whole system is defined as 1 in which inaccuracies shall have little or no impact on connected systems; for example, the air distribution system served by 1 air handler.

E. In the presence of the Commissioning Authority, verify that:

1. Final settings of valves, splitters, dampers and other adjustment devices have been permanently marked.

2. The air system is being controlled to the lowest possible static pressure while still meeting design loads, less diversity; this shall include a review of TAB methods, established control setpoints, and physical verification of at least 1 leg from fan to diffuser having balancing dampers wide open and that during full cooling of terminal units taking off downstream of the static pressure sensor, the terminal unit on the critical leg has its damper 90 percent or more open.

F. No seasonal tests are required

G. No further monitoring is required

H. No deferred testing is required

3.8 SCOPE

A. Test, adjust, and balance the following:

1. Split system air conditioning units

2. Fans

3. Air Inlets and Outlets

3.9 MINIMUM DATA TO BE REPORTED

A. Electric Motors:

1. Manufacturer

2. Model/Frame

3. HP/BHP

4. Phase, voltage, amperage; nameplate, actual, no load

5. RPM

6. Service factor

7. Starter size, rating, heater elements

8. Sheave Make, Size, and Bore

B. V-Belt Drives:

1. Identification/location
2. Required driven RPM
3. Driven sheave, diameter and RPM
4. Belt, size and quantity
5. Motor sheave diameter and RPM
6. Center to center distance, maximum, minimum, and actual

C. Cooling Coils:

1. Identification/number
2. Location
3. Service
4. Manufacturer
5. Air flow, design and actual
6. Entering air DB temperature, design and actual
7. Entering air WB temperature, design and actual
8. Leaving air DB temperature, design and actual
9. Leaving air WB temperature, design and actual
10. Saturated suction temperature, design and actual
11. Air pressure drop, design and actual

D. Air Moving Equipment:

1. Location
2. Manufacturer
3. Model number
4. Serial number
5. Arrangement/Class/Discharge

6. Air flow, specified and actual
7. Return air flow, specified and actual
8. Outside air flow, specified and actual
9. Total static pressure (total external), specified and actual
10. Inlet pressure
11. Discharge pressure
12. Sheave Make, Size, and Bore
13. Number of Belts, Make, and Size
14. Fan RPM

E. Exhaust Fans:

1. Location
2. Manufacturer
3. Model number
4. Serial number
5. Air flow, specified and actual
6. Total static pressure (total external), specified and actual
7. Inlet pressure
8. Discharge pressure
9. Sheave Make, Size, and Bore
10. Number of Belts, Make, and Size
11. Fan RPM

F. Duct Traverses:

1. System zone/branch
2. Duct size
3. Area

4. Design velocity
5. Design air flow
6. Test velocity
7. Test air flow
8. Duct static pressure
9. Air temperature
10. Air correction factor

G. Duct Leak Tests:

1. Description of ductwork under test
2. Duct design operating pressure
3. Duct design test static pressure
4. Duct capacity, air flow
5. Maximum allowable leakage duct capacity times leak factor
6. Test apparatus:
    a. Blower
    b. Orifice, tube size
    c. Orifice size
    d. Calibrated
7. Test static pressure
8. Test orifice differential pressure
9. Leakage.

H. Air Distribution Tests:

1. Air terminal number
2. Room number/location
3. Terminal type

4. Terminal size
5. Area factor
6. Design velocity
7. Design air flow
8. Test (final) velocity
9. Test (final) air flow
10. Percent of design air flow

I. Sound Level Reports:

1. Location
2. Octave bands - equipment off
3. Octave bands - equipment on

J. Vibration Tests:

1. Location of points:
    a. Fan bearing, drive end
    b. Fan bearing, opposite end
    c. Motor bearing, center (if applicable)
    d. Motor bearing, drive end
    e. Motor bearing, opposite end
    f. Casing (bottom or top)
    g. Casing (side)
    h. Duct after flexible connection (discharge)
    i. Duct after flexible connection (suction)

2. Test readings:
    a. Horizontal, velocity and displacement
    b. Vertical, velocity and displacement
    c. Axial, velocity and displacement
3. Normally acceptable readings, velocity and acceleration
4. Unusual conditions at time of test
5. Vibration source (if non-complying)

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Outdoor air-cooled condensing units.

B. Indoor air handler (fan & coil) units unducted, wall mounted.

1.2 RELATED SECTIONS

A. Section 23 05 48 - Vibration and Seismic Controls for HVAC

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Restroom Building bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. AHRI 210/240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment.

B. AHRI 270 (SI/I-P) - Sound Performance Rating of Outdoor Unitary Equipment.

C. AHRI 520 - Performance Rating of Positive Displacement Condensing Units.

D. ASHRAE Std 15 - Safety Standard for Refrigeration Systems.

E. ASHRAE Std 23 - Methods for Performance Testing Positive Displacement Refrigerant Compressors and Compressor Units.

F. NEMA MG 00001 - Motors and Generators.

G. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.

H. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.

I. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical.

## 1.5 SUBMITTALS

A. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

B. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.

C. Design Data: Indicate refrigerant pipe sizing.

D. Manufacturer's Written Instructions: Indicate rigging, assembly, and installation instructions.

E. Sustainable Design Documentation: Submit manufacturer's product data on refrigerant used, showing compliance with specified requirements.

F. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

G. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Department's name and registered with manufacturer.

H. Project Record Documents: Record actual locations of components and connections.

I. Maintenance Materials: Furnish the following for Department's use in maintenance of project.

1. Extra Filters: One for each unit

## 1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this Section, with minimum 3 years of documented experience.

B. Installer Qualifications: Company specializing in performing Work of this Section with minimum 5 years of experience and approved by manufacturer.

## 1.7 WARRANTY

A. Provide five year manufacturers warranty.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Mitsubishi: 500 Corporate Woods Paarkway, Vernon Hills, IL 60061 USA. Phone: 847-478-2100. Website: https://us.mitsubishielectric.com/en/.

### 2.2 SYSTEM DESIGN

A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, fan coil and condensing units; UL listed.

1. Heating: None.

2. Cooling: Air-cooled DX split system with condensing coil and compressor in ducted indoor condensing unit, and evaporator in indoor ducted fan coil unit.

3. Provide refrigerant lines internal to units and between fan coil and condensing units, factory cleaned, dried, pressurized and sealed, with insulated suction line,

B. Performance Requirements: See Drawings for additional requirements.

1. Efficiency:

a. Seasonal Energy Efficiency Ratio: 14 minimum.

b. Energy Efficiency Ratio: 11.7

c. Comply with California Title 24, Part 6 and Title 20 efficiency standards

2. Air Handling: Refer to drawings for performance information

### 2.3 INDOOR FAN COIL UNITS FOR DUCTED SYSTEMS

A. Fan Coil Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, cooling element(s), controls, and accessories; wired for single power connection with control transformer.

1. Air Flow Configuration: Counterflow, with additional steel base.

2. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.

B. Supply Fan: Centrifugal type rubber mounted with direct or belt drive with adjustable variable pitch motor pulley.

1. Motor: NEMA MG 00001; 1750 revolutions per minute single speed, permanently lubricated, hinge mounted.

C. Air Filters: 1 inch thick MERV 8, urethane, washable type arranged for easy replacement.

D. Evaporator Coils: Copper tube aluminum fin assembly, coated for seacoast environment, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.

1. Construction and Ratings: In conformance with AHRI 210/240 and UL 207

2. Manufacturers: System manufacturer.

## 2.4 OUTDOOR AIR-COOLED CENTRIFUGAL FAN CONDENSING UNITS

A. Condensing Units: Self-contained, packaged, pre-wired unit consisting of cabinet, with compressor and condenser.

1. Comply with AHRI 210/240.

2. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.

3. Refrigerant: R-407C.

4. Cabinet: Galvanized steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.

5. Construction and Ratings: In conformance with AHRI 210/240 with testing in conformance with ASHRAE Std 23 and UL 207.

6. Sound Rating: 69 dBA, when measured in conformance with AHRI 270 (SI/I-P).

B. Compressor: Hermetic, 2-speed 1800 and 3600 rpm, AHRI 520 AHRI 520 resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and drier. Provide time delay control to prevent short cycling and rapid speed changes.

C. Air Cooled Condenser: Aluminum fin and copper tube coil, AHRI 520 with direct drive axial propeller fan resiliently mounted, galvanized fan guard.

1. Condenser Fans: Direct-drive centrifugal double inlet type.

2. Condenser Fan Motor: Enclosed, 1-phase type, permanently lubricated.

D. Coil: Air-cooled, aluminum fins bonded to copper tubes, coated for seacoast installation

E. Accessories: Filter drier, high pressure switch (manual reset), low pressure switch (automatic reset), service valves and gage ports, thermometer well (in liquid line).

1. Provide thermostatic expansion valves.

2. Provide hot gas bypass completely contained in the condensing unit.

F. Operating Controls:

1. Control by room thermostat to maintain room temperature setting.

2. Low Ambient Kit: Provide refrigerant pressure switch to cycle condenser fan on when condenser refrigerant pressure is above 285 pound per square inch gauge (psig) and off when pressure drops below 140 psig for operation to 0 degrees Fahrenheit (F).

## 2.5 ACCESSORY EQUIPMENT

A. Room Thermostat: Wall-mounted, electric solid state microcomputer based room thermostat with remote sensor to maintain temperature setting; low-voltage; with following features:

1. 2-line 16 character liquid crystal display.

2. Controls interface: Keypad for setpoint/program control, fan speed selection switch, and unit On/Off selector.

3. Preferential rate control to minimize overshoot and deviation from setpoint.

4. Set-up for four separate temperatures per day.

5. Instant override of setpoint for continuous or timed period from 1 hour to 31 days.

6. Short cycle protection.

7. Programming based on weekdays, Saturday, and Sunday.
8. Selection features including degree Fahrenheit or degree Celsius (C) display, 12 or 24 hour clock, keyboard disable, remote sensor, fan on-auto.
9. Battery replacement without program loss.
10. Thermostat Display:
    a. Time of day
    b. Actual room temperature and humidity
    c. Programmed temperature
    d. Programmed time
    e. Duration of timed override
    f. Day of week
    g. System Mode Indication: Heating, Cooling, Fan Auto, Off, and On, Auto or On, Off
    h. Fan speed
    i. Manufacturers:
        1) Mitsubishi

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.

B. Verify that proper power supply is available and in correct location.

C. Verify that proper fuel supply is available for connection.

D. Verify that water supply is available for humidifier.

## 3.2 INSTALLATION

A. Install in conformance with manufacturer's written instructions and requirements of local authorities having jurisdiction.

B. Install in conformance with NFPA 90A and NFPA 90B.

C. Install refrigeration systems in conformance with ASHRAE Std 15 and 34.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Basic electrical materials, methods, and requirements to perform electrical Work.

## 1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 26 01 27 - Field Tests

C. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables

D. Section 26 05 21 - 600 Volt or Less Rated Wiring System

E. Section 26 05 26 - Grounding and Bonding for Electrical Systems

F. Section 26 05 29 - Hangers and Supports for Electrical Systems

G. Section 26 05 33 - Raceways and Boxes for Electrical Systems

H. Section 26 05 34 - Outlet, Junction, and Pull Boxes

I. Section 26 05 35 - Concrete Pull Boxes

J. Section 26 05 37 - Maintenance Holes and Handholes

K. Section 26 05 41 - Rigid Galvanized Steel Conduit

L. Section 26 05 42 - PVC Conduit

M. Section 26 05 45 - Underground Electrical Work

N. Section 26 05 53 - Identification for Electrical Systems

O. Section 26 05 70 - Electrical Systems Analysis

P. Section 26 05 75 - Electrical Backboard

Q. Section 26 08 02 - Electrical Systems and Products Manufacturer's Certification, Quality Assurance, and Warranty Verification

R. Section 26 09 23 - Lighting Control Devices

S. Section 26 12 12 - Transformers

T. Section 26 24 14 - Low-Voltage Switchboard

U. Section 26 24 16 - Panelboards

V. Section 26 27 26 - Wiring Devices

W. Section 26 27 14 - Electricity Meter

X. Section 26 43 00 - Surge Protective Devices

Y. Section 26 50 00 - Lighting

Z. Section 26 51 13 - Interior Luminaires

AA. Section 26 56 15 - Wooden Poles

BB. Section 26 56 29 - Site Lighting

CC. Section 26 56 61 - Pedestrian Bridge Lighting

DD. Section 31 23 33 - Trenching and Backfilling

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 SUBMITTALS

A. Complete list of materials and equipment proposed for use in Project prior to purchase and installation of materials or equipment.

1. Submittals shall include manufacturer's names and material descriptions or equipment identification such as styles, types, and catalog numbers. Submittal data shall show published ratings or capacity data, detailed equipment drawing for fabricated items, panel diagrams, wiring diagrams, installation instructions, and other pertinent data. Where literature is submitted covering a group or series of similar items, clearly indicate or identify the applicable items. Drawings shall be drawn to scale indicating exact dimensions.

2. Submit in both hard copy and electronic file formats. Provide 1 Dell Laptop, i7, 32 GB, 1 TB with Windows 11 Pro 64, Microsoft 365, and Adobe Acrobat Pro, 1 Dell Pro Thunderbolt 4 Smart Dock, Model No. Wd22TB4, and 5 external flash drives.

B. Review of materials shall be based on the manufacturer's latest published data and such physical tests as may be performed by Department Testing Laboratory.

C. Prior to start of construction, submit to Engineer proposed equipment layout drawings for each equipment room or area containing items of equipment furnished under Division 26. Layout drawings shall consist of plan view of room, to scale, showing projected outlines of equipment, complete with dotted indication of required clearances including those needed for removal of service. Indicate location of conduit and pull boxes.

D. Operation and Maintenance Manuals: Provide 1 copy of indexed operation and maintenance manual which shall include test reports, service instructions, and renewal parts lists of equipment installed in Project. Submit in hard copy and electronic file format.

1. Submit operation and maintenance manuals at least 30 Calendar Days before final inspection. Include the following information together with any pertinent data:

a. Renewal part numbers of replaceable items.

b. Manufacturer’s specific product data.

c. Serial numbers of principal pieces of equipment.

d. Supplier’s name, address, and phone number.

e. Final settings for breakers, relays, and control devices.

E. Submit resume of full-time quality assurance person.

F. Project Records:

1. In addition to the requirements of PROJECT RECORD DOCUMENTS Section, the make and model of equipment installed in Project shall be indicated on Project Record Drawings.

1.5 QUALITY ASSURANCE

A. Provide at Project Site, a full time quality assurance person with minimum 5 years of electrical construction experience. This person shall lay out on plans the installation of electrical equipment, conduit alignments, terminations, wiring, and Work pertaining to electrical construction, which shall be used by the electricians for field installations.

B. Jobsite Workers:

1. Apprentices and Journey Level Electricians:

a. Apprentices shall be registered in a State of California approved apprenticeship program.

b. The use of Journey level electricians shall comply with State of California labor laws.

2. Project Workforce for Compliance with Electrical Safety Policy:

a. 70 percent of Journey Level electricians shall be graduates of a State of California Approved Electrical Apprenticeship Program.

b. 20 percent of Project Site electrical workers shall be Occupational Safety and Health Administration (OSHA) 10-hour General Industry Safety And Health certified.

c. At least 1 Project Site electrical worker shall be OSHA 30-hour General Industry Safety And Health Certified.

d. The workforce ratios indicated in Quality Assurance Article, Jobsite Workers Paragraph, subparagraphs 2a through c shall be determined by verifying the workforce composition on a daily basis.

3. Contractor shall complete Electrical Safety Policy-Implementation Plan form, located in Appendix "F" of Specifications and submit at the time required in NOTICE INVITING BIDS Section.

4. Prior to start of electrical Work, Contractor or subcontractor shall provide proof of compliance to Inspector.

5. Contractor shall continue to monitor and comply with Jobsite Workers Paragraph of this Article requirements for the duration of Contract. Electrical Work may be terminated at any time Contractor is found to be out of compliance.

1.6 MAINTENANCE

A. Spare Parts: Deliver the following spare parts to Engineer and obtain receipts. Submit at same time as operating instructions.

1. Spare fuses: 2 sets for each size combination fused breaker.

2. Spare fuses for low voltage fused switch: 2 sets for each size used on Project.

3. Spare pilot light lamps of each type used on Project, in quantity of 10 percent, but not less than 2 percent.

4. Overload heater elements: 2 sets for each size used on Project.

5. Spare fuses for medium voltage switches: 2 sets for each size fuse used on Project.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials and equipment to be installed shall be standard cataloged products of companies regularly engaged in the manufacture of such products, Underwriters Laboratories, Incorporated (UL) listed, and meet the requirements of City of Los Angeles Electrical Code. The products shall be the latest standard designs in accordance with Drawings and unless otherwise noted.

B. Equipment and devices of the same rating shall be new, interchangeable, and of the same manufacturer. Fixtures and fittings of one classification shall be of the same manufacturer and model.

C. Materials and equipment shall have National Electrical Manufacturers Association (NEMA) NEMA 1 rating for indoor use and NEMA 3R rating for outdoor use.

2.2 NAMEPLATES

A. Furnish and install identifying and functional nameplates for the electrical fixtures and poles. Nameplates shall identify function and controlling circuits.

B. Engrave nameplates on filled metal or 2 ply laminated acrylic and hold in place by mechanical means. Galvanize mechanical fasteners with 2 ounces of hot-dipped zinc per square foot of surface. Characters shall have a minimum height of 4 millimeters for branch circuit identification and minimum of 51 millimeters for warning signs, unless a larger minimum dimension is required by Cal-OSHA or City of Los Angeles Electrical Code.

2.3 ENCLOSURES

A. Indoor: NEMA 1

B. Outdoor: NEMA 3R

C. Switch enclosures shall be clearly marked for maximum voltage, current, and horsepower rating.

PART 3 - EXECUTION

3.1 PREPARATION

A. Perform trench Work and vault excavations as shown on Drawings and in conformance with BASIC SITE MATERIALS AND METHODS and TRENCHING AND BACKFILLING Sections.

3.2 INSTALLATION

A. Perform Work in conformance with City of Los Angeles Electrical Code, American Insurance Association (AIA) regulations, regulations of Industrial Safety Commission of the State of California, and any other legally constituted regulating authority having jurisdiction.

B. Install Work in conformance with NEMA 3R rating for weather resistance.

C. Locate and route new electrical conduits without penetrating through new or existing roof decks or electrical equipment roofs.

D. Exposed conduit, fittings, and straps shall be PVC coated steel conduit unless noted otherwise.

3.3 EMPTY CONDUITS

A. Provide a nylon pull tape in each empty conduit for future use. Secure tape at both ends and provide a minimum 48 inches of slack.

B. Nylon pull tape shall be a 3/8 inch width nylon pull tape. Nylon pull tape shall be permanently printed with the rated tensile strength (1,250 pounds minimum) and sequential footage markings.

C. Nylon pull tape shall be in 1 continuous length without any cuts or ties.

D. Identify each tape at the end of each line with source and destination markers.

3.4 CAPPING EMPTY CONDUITS

A. Cap underground conduits, which are to remain empty, at both ends.

3.5 CONDUITS CROSSING RAILROAD TRACKS

A. Encase electrical, telephone, communications, and signal conduit duct banks crossing new railroad tracks in 3 inch concrete with minimum 2,000 pounds per square inch (psi) strength, extending a minimum of 10 feet on both sides of railroad tracks.

3.6 REPAIR AND RESTORATION

A. Perform trench resurfacing Work as shown on Drawings and in conformance with BASIC SITE MATERIALS AND METHODS and TRENCHING AND BACKFILLING Sections.

3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Compliance Tests:

a. Conduct tests at portions of the installation as may be necessary to ensure full compliance with Drawings and Specifications. Perform tests in presence of Engineer. Costs of tests shall be at sole cost and expense of Contractor. Provide instruments, equipment, labor, and materials to complete tests. Tests may be required on any item between installation of Work and end of 1 year warranty period. Should tests detect defective materials, poor workmanship, or variance with requirements of Specifications, Contractor shall make changes necessary and remedy defects at no additional cost to Department.

2. System Acceptance:

a. Notify Engineer for final inspection prior to system acceptance upon:

1) Completion of installation of systems required under Contract Documents.

2) Submission and acceptance of operating and maintenance data.

3) Completion of identification markers, tags, nameplates, directory cards, and other identification mechanisms as specified in Specifications.

b. Acceptance is contingent upon the following:

1) Completion of final review and correction of deficiencies.

2) Satisfactory completion of acceptance tests which demonstrate compliance with performance and technical requirements of Contract Documents.

3) Satisfactory completion of training program and submission of Operation and Maintenance Manuals and As-Built Drawings required by Contract Documents.

3.8 CLEANING

A. Upon completion, and at other times during the progress of Work, remove surplus materials, trash, and debris resulting from Work.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Electrical field tests

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 05 26 - Grounding and Bonding for Electrical Systems

C. Section 26 05 45 - Underground Electrical Work

D. Section 26 05 53 - Identification for Electrical Systems

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems.

1.5 SUBMITTALS

A. Indexed engineering report presenting the results of field tests.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Testing procedures and recording of test results shall comply with NETA ATS.

B. Electrical Service Company:

1. Contractor shall retain an experienced and skilled electrical service company to make the field tests.

   a. Suggested Company: Electro-Test, Incorporated

2. Contractor shall coordinate the field test Work with the electrical service company.

C. Relays:

1. Field check overcurrent, ground fault relays, and undervoltage relays for proper operation and calibration.

D. Voltage Tests:

1. The electrical service company shall record service voltage for a period of 7 days.

2. Record voltages at transformer secondaries.

3. Record simultaneous load currents.

E. Grounding Networks:

1. Measure the resistance to earth ground of networks at service switchgear, yard substations, wharf, and individual grounding rods at wharf. Measurements shall be made before the grounding networks are interconnected. Refer to GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS Section for maximum resistance acceptable.

F. System Coordination and Protection Selectivity:

1. The report shall include the final coordination curves for selective tripping of overcurrent devices.

2. Curves shall be redrawn where required due to the substitution of relays or fuses other than those used in the engineering design. Install exact fusing and relay setting descriptions at each overcurrent device in a permanent manner.

3. Confirm power shut downs with Engineer to avoid disruption of operations.

G. Report:

1. Results of tests shall be presented in an indexed engineering report. Report shall be completed in a professional manner and submit report to Engineer.

2. The engineering report shall be signed by a State of California registered electrical engineer. The registered engineer shall be a principal officer of the electrical service company.

H. 600 or Less Voltage Conductors:

1. After installation of low voltage conductors (600 volts or less) with splices, the independent electric service company shall megger test conductors with 1,000 volt megger test, and tabulate the results. Tested conductors with 500 megaohm or less shall be replaced by Contractor at no additional cost to Department. Test shall be repeated until the results are greater than 500 megaohm.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Single conductor building wire

B. Wiring connectors

C. Electrical tape

D. Heat shrink tubing

E. Oxide inhibiting compound

F. Wire pulling lubricant

G. Cable ties

1.2 RELATED SECTIONS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems

B. Section 26 05 53 - Identification for Electrical Systems

C. Section 26 27 26 - Wiring Devices

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work in this Section shall be under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire.

B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes.

D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation.

E. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes.

F. FS A-A-59544 - Cable and Wire, Electrical (Power, Fixed Installation).

G. NECA 1 - Standard for Good Workmanship in Electrical Construction.

H. NECA 120 - Standard for Installing Armored Cable (AC) and Type Metal-Clad (MC) Cable.

I. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.

J. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems.

K. NFPA 70 - National Electrical Code.

L. UL 44 - Thermoset-Insulated Wires and Cables.

M. UL 83 - Thermoplastic-Insulated Wires and Cables.

N. UL 486A-486B - Wire Connectors.

O. UL 486C - Splicing Wire Connectors.

P. UL 486D - Sealed Wire Connector Systems.

Q. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape.

R. UL 1569 - Metal-Clad Cables.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.

2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.

3. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with Work.

## 1.6 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

B. Field Quality Control Test Reports.

C. Manufacturer's Written Instructions for Installation: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

E. Maintenance Materials: Furnish the following for Department's use in maintenance of Project.

1. Submit Operations and Maintenance documents and clearly identify its location in the close-out documentation per the requirements of PROJECT RECORD DOCUMENTS Section.

## 1.7 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at Project Site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 3 years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by Occupational Safety and Health Administration (OSHA) as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

## 1.8 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in conformance with manufacturer's written instructions.

1.9 FIELD CONDITIONS

A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees Fahrenheit (F), unless otherwise permitted by manufacturer's written instructions. When installation below this temperature is unavoidable, notify Engineer and obtain direction before proceeding with Work.

PART 2 - PRODUCTS

2.1 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

C. Nonmetallic-sheathed cable is not permitted.

D. Underground feeder and branch-circuit cable is not permitted.

E. Service entrance cable is not permitted.

F. Armored cable is not permitted.

G. Metal-clad cable is permitted only as follows:.

1. Where not otherwise restricted, may be used:

a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.

1) Maximum Length: 6 feet.

2. In addition to other applicable restrictions, may not be used:

a. Unless approved by Department.

b. Where not approved for use by the authority having jurisdiction.

c. Where exposed to view.

d. Where exposed to damage.

e. For damp, wet, or corrosive locations, unless provided with a PVC jacket listed as suitable for those locations.

H. Manufactured wiring systems are not permitted.

2.2 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Provide new conductors and cables manufactured not more than 1 year prior to installation.

D. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, and the like as required for a complete operating system.

E. Comply with NEMA WC 70.

F. Comply with FS A-A-59544 where applicable.

G. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

H. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

I. Conductor Material:

1. Provide copper conductors only. Aluminum conductors are not acceptable for this Project. Conductor sizes indicated are based on copper.

2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.

3. Tinned Copper Conductors: Comply with ASTM B33.

J. Minimum Conductor Size:

1. Branch Circuits: 12 AWG.

a. Exceptions:

1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.

2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.

3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.

K. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

L. Conductor Color Coding:

1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout Project.

2. Color Coding Method: Integrally colored insulation.

a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.

3. Color Code:

a. 480Y/277 V, 3 Phase, 4 Wire System:

1) Phase A: Brown.

2) Phase B: Orange.

3) Phase C: Yellow.

4) Neutral/Grounded: Gray.

b. 240/120 V, 1 Phase, 3 Wire System:

1) Phase A: Black.

2) Phase B: Red.

3) Neutral/Grounded: White.

c. Equipment Ground, All Systems: Green.

d. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.

## 2.3 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:

1. Copper Building Wire:

a. Cerro Wire LLC: www.cerrowire.com.

b. Encore Wire Corporation: www.encorewire.com.

B. Description: Single conductor insulated wire.

C. Conductor Stranding:

1. Feeders and Branch Circuits:

a. Size 10 AWG and Smaller: Solid.

b. Size 8 AWG and Larger: Stranded.

2. Control Circuits: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:

1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.

a. Size 4 AWG and Larger: Type XHHW-2.

## 2.4 METAL-CLAD CABLE

A. Manufacturers:

1. AFC Cable Systems Inc: www.afcweb.com.

2. Encore Wire Corporation: www.encorewire.com.

B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.

C. Conductor Stranding:

1. Size 10 AWG and Smaller: Solid.

2. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.

F. Provide oversized neutral conductors where indicated or required.

G. Provide dedicated neutral conductor for each phase conductor where indicated or required.

H. Grounding: Full-size integral equipment grounding conductor.

I. Armor: Steel, interlocked tape.

J. Provide PVC jacket applied over cable armor where indicated or required for environment of installed location.

2.5 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Connectors for Grounding and Bonding: Comply with GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS Section.

C. Wiring Connectors for Splices and Taps:

1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.

2. Copper Conductors Size 6 AWG and Larger: Use compression connectors.

D. Wiring Connectors for Terminations:

1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.

2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.

3. Copper Conductors Size 8 AWG and Larger: Use compression connectors where connectors are required.

4. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.

E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.

1. Manufacturers:

a. 3M: www.3m.com

b. Ideal Industries, Inc: www.idealindustries.com

H. Compression Connectors: Provide circumferential type or hex type crimp configuration.

1. Manufacturers:

a. Hubbell Electrical Systems (Burndy): www.hubbell.com/burndy/en

b. Ilsco: www.ilsco.com

I. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

1. Manufacturers:

a. Hubbell Electrical Systems (Burndy): www.hubbell.com/burndy/en

b. Ilsco: www.ilsco.com

## 2.6 WIRING ACCESSORIES

A. Electrical Tape:

1. Manufacturers:

a. 3M: www.3m.com

b. Plymouth Rubber Europa: www.plymouthrubber.com

2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.

3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.

4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.

5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.

6. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.

1. Manufacturers:

a. 3M: www.3m.com

b. Hubbell Electrical Systems (Burndy) www.hubbell.com/burndy/en

C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.

1. Manufacturers:

a. Hubbell Electrical Systems (Burndy) www.hubbell.com/burndy/en

D. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

1. Manufacturers:

a. 3M: www.3m.com

b. American Polywater Corporation: www.polywater.com

E. Cable Ties: Material and tensile strength rating suitable for application.

1. Manufacturers:

a. Hubbell Electrical Systems (Burndy) www.hubbell.com/burndy/en

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that Work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in conformance with NFPA 70.

D. Verify that field measurements are as indicated.

E. Verify that conditions are satisfactory for installation prior to starting Work.

3.2 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.3 INSTALLATION

A. Circuiting Requirements:

1. Unless dimensioned, circuit routing indicated is diagrammatic.

2. When circuit destination is indicated without specific routing, determine exact routing required.

3. Arrange circuiting to minimize splices.

4. Include circuit lengths required to install connected devices within 10 feet of location indicated.

5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in conformance with NFPA 70.

6. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.

    a. Provide no more than 6 current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.

    b. Increase size of conductors as required to account for ampacity derating.

    c. Size raceways, boxes, and the like to accommodate conductors.

7. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

B. Install products in conformance with manufacturer's written instructions.

C. Perform Work in conformance with NECA 1 (general workmanship).

D. Install metal-clad cable (Type MC) in conformance with NECA 120.

E. Installation in Raceway:

1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.

2. Pull conductors and cables together into raceway at same time.

3. Do not damage conductors and cables or exceed manufacturer's written instructions for maximum pulling tension and sidewall pressure.

4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

F. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

G. Secure and support conductors and cables in conformance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.

H. Terminate cables using suitable fittings.

1. Metal-Clad Cable (Type MC):
    a. Use listed fittings.
    b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
    c. Do not use direct-bearing set-screw type fittings for cables with aluminum armor.

I. Install conductors with a minimum of 12 inches of slack at each outlet.

J. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.

K. Neatly train and bundle conductors inside boxes, wireways, panelboards, and other equipment enclosures.

L. Group or otherwise identify neutral and grounded conductors with associated ungrounded conductors inside enclosures in conformance with NFPA 70.

M. Make wiring connections using specified wiring connectors.

1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
3. Do not remove conductor strands to facilitate insertion into connector.
4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
5. Compression Connectors: Secure connections using manufacturer's written instructions for tools and dies.

N. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.

1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.

a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.

2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.

a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.

b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.

3. Wet Locations: Use heat shrink tubing.

O. Insulate ends of spare conductors using vinyl insulating electrical tape.

P. Identify conductors and cables in compliance with IDENTIFICATION FOR ELECTRICAL SYSYTEMS Section.

Q. Unless specifically indicated to be excluded, provide final connections to equipment and devices, including those furnished by others, as required for a complete operating system.

3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Inspect and test in conformance with NETA ATS, except Section 4.

2. Perform inspections and tests listed in NETA ATS, Section 7.3.2.

3. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. 600 volt or less rated copper wire, cable, and electrical system

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 05 26 - Grounding and Bonding for Electrical Systems

C. Section 26 05 41 - Rigid Galvanized Steel Conduit

D. Section 26 05 42 - PVC Conduit

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Wire and Cable:

1. Provide 600 volt or less rated low voltage wire and cable with conductors of soft-drawn annealed copper. Unless otherwise noted on Drawings, 600 volt or less rated wire No. 8 AWG and larger shall be stranded and No. 10 AWG and smaller shall be solid.

2. Wire and cable insulation shall be Type THWN-2/THHN (90 degrees C wet or dry), single conductor, for general use as branch circuits and control wiring. No. 12 AWG minimum for branch circuits; No. 16 AWG minimum for control wiring, unless indicated otherwise on Drawings.

B. Connectors and Terminals:

1. For Conductors used in Systems other than Communication and Control Wiring: For connectors sizes No. 10 AWG and smaller, make splices and terminal connections using 1 or 2-piece insulated crimp-type wire joints, splices and terminals manufactured by 1 of the following:

a. Burndy LLC (Hylugs and Hylinks)

b. Ideal Industries, Incorporated (connectors, terminals, and the like.)

c. Thomas & Betts (Sta-Kons)

2. Use ring-tongue lugs on strap-screw device terminals. Do not use crimping tools not specifically designed for the application.

3. For conductor sizes No. 8 AWG and larger, make splices, taps, and terminal connections using City of Los Angeles Department of Building and Safety listed cast or machined high-conductivity copper alloy connectors of the circular clamp type with multiple socket-head cap screws manufactured by T & B, OZ Electrical Manufacturing Company, Incorporated, Types "L", "LM", "TW", "TWC", "T", "TC". Except where insulated covers are provided, fill voids and irregularities on connections with insulation putty and cover with 2 half-lapped layers of electrical insulating tape and 1 half-lapped layer of friction tape.

C. Wire Pulling Lubricants:

1. Provide wire pulling lubricants in accordance with the following schedule:

| Jacket | Manufacturer and Type |
|---|---|
| | |
| Polyethylene | Burndy: Albentonite |
| | |
| Other (except asbestos) | Ideal: Yellow 77 |

D. Ties:

1. Conductor ties shall be Ty-Raps, as manufactured by Thomas & Betts.

E. Insulation Putty: Scotchfil as manufactured by 3M.

F. Insulating Tape: Scotch Super 88 as manufactured by 3M.

2.2 IDENTIFICATION

A. Color Coding:

1. Provide color coding as follows:

| | Phase A | Phase B | Phase C | Neutral |
|---|---|---|---|---|
| | | | | |
| 240 volts and below | Black | Red | Blue | White |
| | | | | |
| 250 to 480 volts | Brown | Orange | Yellow | White with Tracer |
| | | | | |
| Insulated Equipment Ground: Green | | | | |
| | | | | |
| Control Wiring: Purple | | | | |

2. For insulations and jackets not manufactured by the selected vendor with integral colors, use Scotch No. 35 color-coding tape on each conductor entering every bow, trough, cabinet, and wireway and at intervals not exceeding 5 feet in wireways, trench duct, and other locations where conductors are continuously accessible.

B. Conductor Identification:

1. Other than color-coding, identify conductor with panel and circuit number and additional numbering systems shown on Drawings. Identify circuits by means of numbered tape markers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Do not pull wire or cable through box fitting or enclosure where change of raceway alignment or direction occurs.

2. Do not cut strands from conductors to fit lugs or terminals.

3. Do not bend conductors to less than recommended radius.

4. Use temporary guides, sleeves, rollers, and other hardware to protect cable from excess tension or abrasion during installation.

5. Splices are not allowed on control and communication wiring when pulling through junction boxes or pull boxes. Conductors shall be terminated only at their origination and final terminal blocks. Terminations shall be made with terminal blocks; splicing with wire nuts is not acceptable.

B. Wiring in Enclosures:

1. Form and tie conductors in panelboards, cabinets, control panels, wireways and wiring troughs, providing circuit and conductor identification, using T & B Ty-Raps of appropriate size and type.

2. Limit spacing between ties to 15 centimeters and provide circuit and conductor identification at least once in each enclosure.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Grounding and bonding for electrical systems to:

1. Prevent transient over-voltages and the energization of conductive machine frames, enclosures, appliances, and structures due to lightning.

2. Improve the capability of overcurrent devices to sense and interrupt ground fault currents by minimizing the impedance of ground current return paths to transformer neutrals.

## 1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 05 34 - Outlet, Junction, and Pull Boxes

C. Section 26 05 53 - Identification for Electrical Systems

D. Section 26 24 14 - Low-Voltage Switchboard

E. Section 26 24 16 - Panelboards

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

## 1.4 SUBMITTALS

A. Two copies of certified test reports.

# PART 2 - PRODUCTS

## 2.1 MATERIALS

A. Grounding electrodes shall be 3/4-inch diameter by 10-feet long copper jacketed stainless steel.

B. Ground clamp onto grounding electrode shall be as shown on Drawings.

C. Concrete box shall be as shown on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Grounded service equipment, motor frames, switchgear and equipment enclosures, lighting and power panel boards, transformers, raceways, fences and gates, building or structure steel frames, lighting standards, floodlight poles, power/light pull boxes/maintenance holes, in conformance with the applicable requirements of City of Los Angeles Electrical Code. At buildings and substations, ground connection shall be made to buried ground bus consisting of a 4/0 softdrawn, annealed, bare stranded copper cable connected to 3/4-inch diameter, 10 foot long stainless steel ground rods, spaced 6 feet minimum. Resistance of the ground bus with rods connected but without supplementary connection shall be less than 25 ohm at any point. Ground rods shall be stainless steel clad.

2. Ground bus shall also be connected at 2 or more points to water main if same is within practical distance.

3. Underground connections, including ground rod connections to structural steel, shall be made by Cadweld or other exothermic process, or Burndy Compression System.

4. Coat cadweld connections with an epoxy resin compound for protection against corrosion.

5. Above ground, Code-approved copper ground clamps, connectors, and lugs shall be used whenever another method of connections is not specified. Ground connectors shall be of the multiple bolt type. Bolts, washers, and stop nuts shall be of high copper alloy, Everdur, Durium, Duronze, or silicon bronze. Ferrous hardware is not acceptable. Size of grounding conductors shall have a minimum current carrying capacity in conformance with City of Los Angeles Electrical Code or the size indicated on Drawings.

6. Length of grounding conductors or jumpers shall be kept to a minimum. Where flexible conduit is used, provide a bonding jumper between conduit ends.

B. Connection of Equipment to the Structural Steel:

1. If the grounding conductors connected to the structural steel are No. 2 AWG or larger, make the connection to the steel using Cadweld or Burndy Compression System process using proper molds and charges. If conductors are smaller than No. 2 AWG, install a stud in the steel using a high-velocity powder actuated tool and bolt the conductor lug to the stud.

2. Provide a connection to the direct ground for transformer neutrals when the transformer rating is 9 kVA or larger. Use an insulated conductor sized in conformance with City of Los Angeles Electrical Code but not smaller than No. 2 AWG.

3. Provide a connection to the direct ground for the ground bus in switchgear assemblies, and power panel boards, except where the power panel boards are directly mounted and bolted to a steel structure. Use an insulated conductor sized in conformance with City of Los Angeles Electrical Code but not smaller than No. 6 AWG.

4. Install an insulated No. 2 AWG conductor from each set of lightning arrestors or surge capacitors to the nearest direct ground.

C. Equipment Grounding:

1. Provide an electrically continuous copper equipment grounding conductor, color-coded green, and sized in conformance with City of Los Angeles Electrical Code, pulled into electrical raceways containing conductors of systems rated higher than 30 V. Bond to grounding lugs, equipment, fixtures, enclosures, and transformer neutrals.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. General:

a. Measure the ground resistance employing Fall-of-Potential method using a Biddle Megger Earth Tester with 2 electrodes after complete erection of the structural steel and installation of grounding system.

2. Test Reports:

a. Submit to Engineer 2 copies of the test reports certified by the testing technician and Engineer's representative authorized to witness the test.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical Work.

## 1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

B. Section 26 00 01 - Basic Electrical Materials and Methods

C. Section 26 05 33 - Raceways and Boxes for Electrical Systems

D. Section 26 50 00 - Lighting

E. Section 32 13 14 - Concrete for Exterior Improvements

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work under this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.

D. MFMA-4 - Metal Framing Standards Publication.

E. NECA 1 - Standard for Good Workmanship in Electrical Construction.

F. NFPA 70 - National Electrical Code.

G. UL 5B - Strut-Type Channel Raceways and Fittings.

## 1.5 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.

2. Coordinate Work with other trades to provide additional framing and materials required for installation.

3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.

4. Coordinate the arrangement of supports with ductwork, piping, equipment, and other potential conflicts installed under other sections or by others.

5. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with Work.

B. Sequencing:

1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in conformance with CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

## 1.6 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for metal channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.

B. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.

C. Evaluation Reports: For products specified as requiring evaluation and recognition by ICC Evaluation Service, LLC (ICC-ES), provide current ICC-ES evaluation reports upon request.

D. Installer's Qualifications: Include evidence of compliance with specified requirements.

E. Manufacturer's Written Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.7 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Comply with applicable City of Los Angeles Building Codes.

C. Maintain at Project Site a copy of each referenced document that prescribes execution requirements.

D. Installer Qualifications for Powder-Actuated Fasteners (when specified): Certified by fastener system manufacturer with current operator's license.

E. Installer Qualifications for Field-Welding: As specified in METAL FABRICATIONS Section.

F. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in conformance with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:

1. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical Work.

2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.

3. Where support and attachment component types and sizes are not indicated, select in compliance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 5. Include consideration for vibration, equipment operation, and shock loads where applicable.

4. Do not use products for applications other than as permitted by NFPA 70 and product listing.

5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.

6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.

    a. Indoor Dry Locations: Use zinc-plated steel unless otherwise indicated.

    b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel unless otherwise indicated.

    c. Zinc-Plated Steel: Electroplated in conformance with ASTM B633.

    d. Galvanized Steel: Hot-dip galvanized after fabrication in conformance with ASTM A123/A123M or ASTM A153/A153M.

B. Materials for Metal Fabricated Supports: Comply with METAL FABRICATIONS Section.

C. Conduit and Cable Supports: Straps, clamps, and the like suitable for the conduit or cable to be supported.

1. Conduit Straps: 1-hole or 2-hole type; steel or malleable iron.

2. Conduit Clamps: Bolted type unless otherwise indicated.

3. Manufacturers:

    a. Eaton www.eaton.com/us/en-us.html

    b. nVent ERICO International Corporation www.erico.com

D. Outlet Box Supports: Hangers, brackets, and the like suitable for the boxes to be supported.

1. Manufacturers:

    a. Eaton: www.eaton.com/us/en-us.html

    b. nVent ERICO International Corporation: www.erico.com

E. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.

1. Comply with MFMA-4.

2. Channel (Strut) Used as Raceway (only where specifically indicated): Listed and labeled as complying with UL 5B.
3. Channel Material:
    a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
    b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
4. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch.
5. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
6. Manufacturers:
    a. Eaton: www.eaton.com/us/en-us.html
    b. ABB: new.abb.com
    c. Unistrut, a part of Atkore International: www.unistrut.us

F. Source Limitations: Furnish channels (struts) and associated fittings, accessories, and hardware produced by a single manufacturer.

G. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
1. Minimum Size, Unless Otherwise Indicated or Required:
    a. Equipment Supports: 1/2 inch diameter.
    b. Busway Supports: 1/2 inch diameter.
    c. Single Conduit up to 1 inch trade size: 1/4 inch diameter.
    d. Single Conduit larger than 1 inch trade size: 3/8 inch diameter.
    e. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
    f. Outlet Boxes: 1/4 inch diameter.
    g. Luminaires: 1/4 inch diameter.

H. Anchors and Fasteners:

1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
4. Hollow Masonry: Use toggle bolts.
5. Hollow Stud Walls: Use toggle bolts.
6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
7. Sheet Metal: Use sheet metal screws.
8. Wood: Use wood screws.
9. Plastic and lead anchors are not permitted.
10. Powder-actuated fasteners are not permitted.
    a. Where approved by Engineer.
    b. Use only threaded studs; do not use pins.
11. Hammer-driven anchors and fasteners are not permitted.
    a. Nails are permitted for attachment of nonmetallic boxes to wood frame construction (when specified).
    b. Staples are permitted for attachment of nonmetallic-sheathed cable to wood frame construction (when specified).
12. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
    a. Comply with MFMA-4.
    b. Channel Material: Use galvanized steel.
    c. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch minimum base metal thickness.
    d. Manufacturer: Same as manufacturer of metal channel (strut) framing system.

13. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.

14. Manufacturers - Mechanical Anchors:

    a. Hilti: www.hilti.com

    b. ITW Red Head, a division of Illinois Tool Works: www.itwredhead.com

15. Manufacturers - Powder-Actuated Fastening Systems:

    a. Hilti: www.hilti.com

    b. Ramset, a division of Illinois Tool Works: www.ramset.com

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting Work.

3.2 INSTALLATION

A. Install products in conformance with manufacturer's written instructions.

B. Perform Work in conformance with NECA 1 (general workmanship).

C. Install anchors and fasteners in compliance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

E. Unless specifically indicated or approved by Engineer, do not provide support from suspended ceiling support system or ceiling grid.

F. Unless specifically indicated or approved by Engineer, do not provide support from roof deck.

G. Do not penetrate or otherwise notch or cut structural members without approval of Engineer.

H. Field-Welding (where approved by Engineer): Comply with METAL FABRICATIONS Section.

I. Equipment Support and Attachment:

1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.

2. Use metal channel (strut) secured to studs to support equipment

a. Surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.

3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.

4. Unless otherwise indicated, mount floor-mounted equipment on properly sized 3 inch high concrete pad constructed in compliance with CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

J. Conduit Support and Attachment: Comply with RACEWAYS AND BOXES FOR ELECTRICAL SYSTYEMS Section.

K. Box Support and Attachment: Comply with RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS Section.

L. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.

M. Secure fasteners conforming to manufacturer's written instructions for torque settings.

N. Remove temporary supports.

O. Identify independent electrical component support wires above accessible ceilings (only where specifically indicated or permitted) with color distinguishable from ceiling support wires in compliance with NFPA 70.

## 3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Inspect support and attachment components for damage and defects.

2. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

3. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Conduit raceways and fittings

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASME B1.20.1 - Pipe Threads, General Purpose, Inch.

B. ASTM A90/A90M - Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.

C. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Metal Conduit and Intermediate Metal Conduit.

1.5 SUBMITTALS

A. Submit catalog cuts of conduit products, accessories, and fittings.

PART 2 - PRODUCTS

2.1 RIGID GALVANIZED STEEL CONDUIT

A. Conduit shall be City of Los Angeles Department of Building and Safety approved or meet requirements of a recognized testing laboratory approved by City of Los Angeles Department of Building and Safety.

B. Couplings, fittings, and adapters shall be of the same materials and size as the conduit.

C. Plastic spacers for direct burial or concrete encasement shall be of size required to fit conduit and as manufactured by Carlon Products.

D. Zinc Coating:

1. Galvanized steel conduit, bends, and couplings shall be coated by the hot dip process. Other processes, such as metal spray, high zinc coatings, and cold galvanizing, can not be substituted for hot-dipped galvanizing, either in whole or in part.

2. Galvanizing shall be applied to produce a smooth, uniform coating with no flaws or thin spots.

3. The weight of zinc coatings shall not be less than 1.0 ounce per square foot on the outside and 1.0 ounce per foot of zinc on the inside of the conduit, conduit bends, and couplings.

4. Outside and inside surfaces shall be tested separately by Department Testing Laboratory.

5. The determination of the weight of zinc coating shall be done in conformance with ASTM A90/A90M.

6. The conduit after galvanizing shall be uniformly pliable and free from brittleness. When a sample is bent to a semi-circle with an inner radius of six times normal internal diameter, the steel shall not crack, the welded joints shall not open, nor the zinc coating crack, flake, or be removable by rubbing with the bare fingers.

E. PVC Coated Conduit:

1. Where indicated on Drawings, use Plasti-Bond Red PVC coated rigid galvanized conduit as manufactured by Robroy Industries.

2. PVC coated conduit shall conform with NEMA RN 1 with a urethane interior coating.

3. Conduit threads shall be factory made and galvanized. No field threading permitted.

4. Fittings, couplings, elbows, and adapters shall be of the same materials and manufacturer as the conduit.

2.2 PVC CONDUITS

A. Conduit, fittings, and bends shall be Schedule 80 unless otherwise noted on Drawings.

B. Conduit color is not important, except that any system installed in the open, where it is visible, shall be of the same color materials.

C. Couplings, fittings, and adapters shall be of the same materials as the conduit.

D. Sealing and joining compounds shall be as recommended by the conduit manufacturer.

E. Conduit and fittings shall be made from clean, virgin, Type II, Grade I, polyvinyl chloride.

F. Dimensions and tolerances shall conform to City of Los Angeles Electrical Code requirements for rigid PVC.

G. Materials shall contain labels as may be required by City of Los Angeles Electrical Code.

H. Joints between PVC and PVC, or between PVC conduit and PVC-coated steel conduit shall be socket-type solvent weld or threaded fittings.

I. Plastic spacers for direct burial or concrete encasement shall be of size required to fit conduit and as manufactured by Carlon Products.

2.3 ELECTRIC METALLIC TUBING (EMT)

A. Electric metallic tubing shall be City of Los Angeles Department of Building and Safety approved and standard for electrical metallic tubing applying to conduit galvanized by the hot dip process.

B. Couplings, fittings, and adapters shall be of the same material and size as the conduit.

C. Flexible conduits shall be an approved type and shall be spanned by a bonding assembly meeting City of Los Angeles Electrical Code requirements.

D. Zinc coating requirements: Refer to Zinc Coating Paragraph of Rigid Galvanized Steel Conduit Article of this Section.

2.4 FOR UNDERGROUND CONSTRUCTION

A. Use rigid PVC Schedule 40 for power up to 600 volts and for communication conduits.

B. Underground concrete envelope for over 600 volts shall be in conformance with BASIC SITE MATERIALS AND METHODS Section.

C. Use rigid galvanized or PVC Schedule 80 for installation under floor slabs.

D. The last 10 feet of buried conduit shall be galvanized steel conduit PVC coated as called for on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install conduit raceways in a neat and orderly manner. Raceways shall run true and be aligned plumb vertically and horizontally. Fasteners shall be factory designed and supports installed at spacing prescribed in City of Los Angeles Electrical Code.

2. Conduits shall be cut square and rigid galvanized steel joint shall be painted with a rust resisting paint. Fittings shall be factory-approved, and 1 1/4 inch ELLs and larger shall be factory ELLs. Set screw fittings on EMT shall be restricted to 1 inch conduit or smaller; compression fittings on 2 inch or larger.

3. Branch circuits and feeders are shown schematically on Drawings. Provide conduits with junction boxes, condulets, expansion fittings, ELLs, and supports as required by City of Los Angeles Electrical Code. Routing of conduit shall be field engineered unless otherwise noted on Drawings.

4. Conduit sizes indicated or specified on the wiring diagram and floor plans on Drawings are for copper conductors in steel conduit without a grounding conductor. Conduit sizes shall be increased by Contractor if ground wires are installed.

5. Where conduit home runs to panels are grouped and exposed, coordinate the exact routing of the hanger system with Engineer.

6. Minimum size of conduits shall be 3/4 inch.

7. Install conduit in compliance with City of Los Angeles Electrical Code and in the following manner:

   a. Concealed in Finished Areas: EMT with set screw fittings or compression fittings.

   b. Surface mounted parallel with building lines in warehouse or plant areas shall be EMT with set screw fittings or compression fittings. Diagonal runs not allowed.

   c. Rigid Plastic Conduit for Telephone Work: Schedule 40.

   d. Conduits shall be flashed and sealed at locations where the conduit pierces exterior walls or roofs.

   e. Conduits in structural concrete slab shall not exceed 1/3 the thickness of the concrete: Maintain a clearance of 3 inches where installed parallel to the reinforcing bars.

   f. The cutting of structural building members of the routing of conduit shall not be permitted unless approved by Engineer.

   g. Install conduit stub-ups in tilt-up buildings with a coupling flush in the ground floor slab in order that stub-ups shall not interfere with pouring of tilt-up concrete panels.

   h. Install conduit trapeze hangers with 3/8 inch rod minimum and supported by thru-bolts at roof structural members. Lag screws not allowed.

   i. In office areas and other finished areas where concrete panels are not furred, install conduit and outlets concealed in wall.

   j. Rigid plastic conduit shall be supported at 4'-0" spacings.

   k. Provide grounding conductor in non-metallic conduits. Conduits are sized on Drawings for metallic conduit and copper cables. Increase conduit capacity if required.

   l. Install circuits rated above 600 volts in rigid galvanized conduits above ground.

   m. Install grounding conductor in conformance with City of Los Angeles Electrical Code.

n. Conduits shall be installed in fill below slab without reducing thickness of slab or vapor seal.

B. Rigid Galvanized Steel:

1. Exercise care in bending conduit to prevent damage to the conduit.

2. The radius of the curve of the inner edge of a field bend shall not be less than 6 times the internal diameter of the conduit. The internal diameter of the conduit at the bend shall not be reduced.

3. A run of conduit between box and box, between fitting and fitting, or between box and fitting shall not contain more than the equivalent of four 90 degree bends (360 degrees total), in compliance with City of Los Angeles Electrical Code requirements.

4. End of conduit shall be reamed to remove rough edges and where a conduit enters a box or other fittings. Use approved hot-dipped galvanized bushing and locknut to protect the wire from the abrasion unless the design of box and fitting accomplishes the equivalent purposes.

5. Install conduit as a complete, continuous system, mechanically and electrically connected to boxes and fittings. Connect boxes and fitting to provide electrical continuity.

6. Conduit shall be jointed with approved couplings and unions. Right angle bends, offsets and change-in-direction bends shall be made with hickey or power bends, standard elbows, conduit fittings, or pull boxes. Conduit runs shall be uniform and symmetrical. Joints in conduit installed in concrete or earth, or exposed to the weather shall be liquid and gas tight.

7. Install conduit runs which extend through areas of different temperature or atmospheric conditions, or which are partially indoors and partially outdoors, in a manner which shall prevent drainage of condensed or entrapped moisture into pull boxes, cabinets, or equipment. Drill overhead fittings at point of entry to box or cabinet.

8. Conduit runs for direct burial or concrete encasement shall have plastic spacers at not more than 5'-0" on centers. Install spacers on firm bearing surfaces before backfilling or concrete encasement.

9. Conduit runs which cross concrete structure joints shall have conduit expansion fittings, approved by Engineer, at structural joints.

10. Install PVC coated conduit with tools specifically designed to prevent damage to PVC coating.

11. Repair damage to PVC coatings to the satisfaction of Engineer or replace the component parts with undamaged components.

12. Cleaning: Conduit runs shall be cleaned and swabbed to remove foreign matter and moisture prior to pulling in wire or cable. Boxes in which conduits terminate shall be cleaned of foreign matter and threads. Boxes shall be left broom clean upon completion.

C. PVC Conduit:

1. PVC conduit shall be jointed by socket type solvent weld or threaded fittings.

2. Conduit shall be cut square and externally chamfered approximately 10 to 15 degrees. Remove burrs and fins.

3. Exercise care not to place stress on previously made joints. Allow joints to set before handling according to air temperature as follows:

| Air Temperature | Minimum Set Time |
|---|---|
| | |
| 60 degrees to 100 degrees Farenheit | 30 minutes |
| below 60 degrees Farenheit | 60 minutes |

4. Apply solvent in such a manner that no material is deposited on the interior surface or extruded into the interior during jointing. Excess cement on the exterior of the joint shall be wiped clean immediately after assembly.

5. Threads for plastic conduit shall be as specified in ASME B1.20.1. Install a plug in the bore to prevent distortion prior to threading.

6. Threaded joints shall be made using teflon tape or other approved jointing material. Solvent shall not be used with threaded joints.

7. Protect conduit from tool damage during assembly. Vises shall have padded jaws and strap wrenches shall be used for installation of fittings and nipples.

8. Conduit which has been nicked, scarred, or otherwise damaged shall be removed and replaced at no additional cost to Department.

9. Conduit runs for direct burial or concrete encasement shall have plastic spacers spaced at nor more than 5'-0" on center. Spacers shall be installed on firm bearing (surfaces) before backfilling or placing concrete.

10. Bends and transitions from buried or encased runs to exposed runs shall be made with PVC coated steel conduit. The transition shall include as a minimum the last 5 feet of the buried or encased conduit and the first 3 feet of exposed conduit.

11. PVC conduit runs shall contain a grounding conductor.

D. Electrical Metallic Tubing (EMT):

1. Exercise care in bending conduit to prevent damage to the conduit.

2. The radius of the curve of the inner edge of a field bend shall not be less than 6 times the internal diameter of the conduit. The internal diameter of the conduit at the bend shall not be reduced.

3. A run of conduit between box and box, between fitting and fitting, or between box and fitting shall not contain more than the equivalent of four 90 degree bends (360 degrees total), in compliance with City of Los Angeles Electrical Code requirements.

4. Terminations of conduit shall be reamed where a conduit enters a box and other fittings and to remove rough edges.

5. Continuous runs shall be installed as a complete, continuous system, mechanically and electrically connected to boxes and fittings. Boxes and fittings shall be connected to provide electrical continuity.

6. Coupling and unions shall be joined with approved couplings and unions. Right angle bends, offsets and change-in-direction bends shall be made with hickey or power bends, standard elbows, conduit fittings, or pull boxes. Conduit runs shall be uniform and symmetrical. Joints in conduit installed in concrete or earth, or exposed to the weather shall be liquid and gas tight.

7. Conduit runs shall be cleaned and swabbed to remove foreign matter and moisture prior to pulling in wire to cable. Boxes in which conduits terminate shall be cleaned of foreign matter and threads. Leave boxes broom clean upon completion.

8. Conduit runs for concrete encasement shall have plastic spacers at not more than 5'-0" on centers. Install spacers on firm bearing surfaces before backfilling or concrete encasement.

END OF SECTION

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Outlet boxes

B. Junction boxes

C. Pull boxes

### 1.2 RELATED SECTIONS

A. Section 05 05 14 - Treating Damaged Galvanizing

B. Section 26 00 01 - Basic Electrical Materials and Methods

C. Section 26 05 41 - Rigid Galvanized Steel Conduit

### 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Boxes shall be pressed steel or cast iron unless otherwise noted on Drawings.

B. Hot-dip galvanized steel and cast iron outlet boxes.

C. Boxes shall be sized in conformance with City of Los Angeles Electrical Code and space requirements, but in no case less than 4 inch by 4 inch by 1 1/2 inches deep. Conduit penetration shall be located so that the cable can be installed without bending it to a radius less than the recommended as a minimum by the cable manufacturer.

D. Boxes installed outside or in wet locations shall have taper threaded conduit hubs and gasketed covers. Boxes listed for use in wet locations shall be National Electrical Manufacturers Association (NEMA) 3R weather rated.

E. Boxes installed in hazardous locations shall conform to City of Los Angeles Electrical Code.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Install boxes to be accessible after completion of the structures; securely mounted and plumb with surrounding structural members. Boxes shall be secured in place independently of conduits entering them.

B. Install junction box for lighting fixtures as detailed on Drawings.

C. Install outlet, junction, pull boxes, conduit bodies, and fittings in conformance with City of Los Angeles Electrical Code.

### 3.2 REPAIR OF DAMAGED GALVANIZING

A. Repair damaged galvanizing in conformance with TREATING DAMAGED GALVANIZING Section.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concrete pull boxes

B. Underground ducts

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary.

1.5 SUBMITTALS

A. Shop Drawings: Submit catalog cuts, descriptive data, and structural design calculation for precast pull boxes.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Jensen Precast Products

2.2 PRECAST PULL BOXES

A. Precast concrete pull boxes shall comply with the criteria and details shown on Drawings. Refer to Drawings for size of pull box.

1. The precast reinforced concrete pull box shall be capable of sustaining loads and pressures resulting from vertical and lateral earth loadings, vehicular loadings, or combinations as shown on Drawings.

B. The following criteria shall be used for design, but shall not minimize Drawing requirements:

1. Earth density = 120 pounds per cubic foot (lb./cu. ft.)

2. Equivalent fluid pressure for lateral pressure due to earth shall be 85 lb./sq. ft./ft. Minimum safety factor for buoyancy shall be 1.25.

3. Vehicular loading shall be 100 kips wheel plus 25 percent impact on a 2'-0" by 2'-6" wheel imprint area, wheels 6’-0” apart on centers, unless noted otherwise for installations in terminals.

4. Design and details shall comply with minimum ACI CODE-318 requirements. Minimum f’c=3,000 pounds per square inch (psi).

C. Pull Box Structure: Designed to withstand forces due to additional inward load of 4,000 pounds (working load) with safety factor of 2, acting perpendicular to the surface at any pulling iron.

D. Pull Box: Design to provide a dry, water-tight installation.

E. Calculations and Details: Prepared by a civil engineer registered in the State of California and experienced in this type of design.

F. Precast Concrete Pull Boxes: Rectangular or octagonal type conforming to applicable provisions specified or shown on Drawings regarding cover assemblies, pulling irons, hardware, and the like.

G. Each pull box section shall be equipped with necking frame suitable for installation of cover assembly. If necessary, provide concrete grade ring(s) to bring top of cover to required elevation.

H. Each pull box section shall have suitable knockouts or openings in vertical walls for duct banks and conduits entering the pull box.

I. Furnish each pull box with sump with minimum dimensions of 12 inch diameter and depth as indicated on Drawings.

J. Metallic parts of the pull box shall have galvanized finish.

## PART 3 - EXECUTION

### 3.1 PULL BOXES

A. Install in accordance with details on Drawings and manufacturer's written instructions.

B. Place pulling irons on each end opposite walls and below horizontal centerlines of ducts and knockouts. Install pulling irons with each end hooked behind reinforcing bar.

C. Ground exposed non-current carrying metal parts of the pull box.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Maintenance holes

B. Handholes

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 31 23 33 - Trenching and Backfilling

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM A48/A48M - Standard Specification for Gray Iron Castings.

B. ASTM C478/C478M - Standard Specification for Circular Precast Reinforced Concrete Manhole Sections.

C. Reference Specifications (RS):

Section 200 - Rock Materials

Subsection 200-1 - Rock Products

1.5 SUBMITTALS

A. Submit shop drawings and calculations, sealed by a currently registered structural engineer in the State of California, for precast concrete maintenance holes.

1. Submit fully dimensioned shop drawings for precast concrete items showing weights, steel reinforcing, openings, blockouts, and accessory items such as pulling irons, ladders, maintenance hole risers, covers, hatches, and sumps.

2. Submit structural calculations for precast concrete items as follows:

    a. Submit structural calculations for loads including traffic, soil pressure, and live loads.

    b. Submit buoyancy calculations based on water table at 5 feet below grade. Products shall have a buoyancy safety factor of 1.5 minimum.

    c. The calculations shall include a statement by the structural engineer that products are suitable for use in Seismic Zone 4 as defined by City of Los Angeles Building Code.

3. Shop drawings or calculations shall include fabricators cautions, warnings, or restrictions on product use or installation.

1.6 QUALITY ASSURANCE

A. Precast concrete maintenance holes shall be fabricated by a supplier regularly engaged for at least 10 years in design, fabrication, and installation of concrete products for electrical power wiring.

PART 2 - PRODUCTS

2.1 PRECAST CONCRETE MAINTENANCE HOLES

A. Precast concrete maintenance holes, risers, and tops shall conform to ASTM C478/C478M, except that the spacing of maintenance holes steps or ladder rungs shall not exceed 16 inches. Precast units shall be the product of a manufacturer regularly engaged in the manufacture of precast concrete maintenance holes. Maintenance holes shall be the type noted on Drawings and shall be constructed in accordance with the applicable details shown on Drawings. Top, walls, and bottom shall consist of reinforced concrete constructed in modular sections with tongue-and-groove joints. Walls and bottom shall be of monolithic concrete construction. Covers shall fit the frames without undue play. Steel and iron shall be formed to shape and size with sharp lines and angles. Castings shall be free from warp and blow holes that may impair their strength or appearance. Exposed metal shall have a smooth finish and sharp lines. Provide necessary lugs, rabbets, and brackets.

B. Provide precast concrete maintenance holes for power and telephone cabling and equipment, sized and located where indicated on Drawings. Maintenance holes shall be integrally formed walls and floor with cover, base unit with risers and cover, or panel construction with base, walls and cover(s), depending on size.

C. Provide precast concrete maintenance holes for installation and pulling cables, changes in direction of ductbanks and cabling, and terminating and splicing cabling. Precast concrete maintenance holes are, in general, over 48 inches by 48 inches by 48 inches with maintenance holes lid rings and risers and cast iron maintenance hole lids. Precast concrete maintenance holes are intended for personnel entry during installation and maintenance of cabling and wiring systems.

D. Maintenance holes shall be designed and constructed to accommodate the following load criteria unless shown otherwise on Drawings: Vehicular loading shall be 100 kips wheel plus 25 percent impact on a 2'-0" by 2'-6" wheel imprint area, wheels 6’-0” apart on centers for installations in terminals.

E. Each maintenance hole shall have ladders with extendable ladder safety posts, Ladderup as manufactured by Bilco, or equivalent products by O’Keefe, or Milcor, and 3 cast-in-place steel channels on each side wall for cable racking and support.

F. Maintenance holes shall be steel reinforced precast concrete with integrally formed base and walls. Maintenance holes shall be designed and constructed to accommodate the loading criteria shown on Drawings for the various areas of the terminal.

1. Provide with pulling irons, 1 in each corner.

2. Provide with 30 inches diameter cast iron or ductile iron maintenance holes ring and 30 inches diameter cast iron cover, rated for load criteria shown on Drawings. Covers shall be bolted down with stainless steel bolts, nuts, and washers.

G. Maintenance holes shall have a sump and drain in the floor fitted with a removable grate that is flush with the floor of the maintenance holes so as to result in a uniform smooth walking surface.

H. Where Drawings call for a maintenance hole to include a check valve, provide a 4-inch backwater valve, Model Z-1099 by Zurn.

I. Maintenance holes shall be manufactured by Jensen.

J. Duct Entry Provisions: Windows with plastic duct terminators and diaphragms. Duct entrances and windows shall be located near the corners of structures to facilitate cable racking.

K. Cable Pulling Irons: Use galvanized rod and hardware. A pulling-in iron shall be installed in the wall opposite each duct line entrance. Pulling-in irons and other built-in items shall be set in place before depositing concrete. Provide watertight seal.

L. Cable Rack Inserts: Minimum load rating of 800 pounds.

M. Ladder: Steel, with top hook to engage maintenance holes step in riser casting. Provide 1 ladder for each maintenance hole.

N. Sump Covers: ASTM A48/A48M; Class 30B gray cast iron.

O. Riser Casting: 6 inch, with maintenance holes step cast into frame.

P. Frames and Covers: ASTM A48/A48M; Class 30B gray cast iron, 30 inch size, machine finished with flat bearing surfaces. The words "ELECTRIC" and "DANGER HIGH-VOLTAGE KEEP OUT" shall be cast in the top face of power maintenance hole covers.

2.2 PRECAST CONCRETE HANDHOLES

A. Provide precast concrete handholes for power and telephone cabling and equipment, sized and located where indicated on Drawings. Contractor shall design precast concrete handholes to accommodate the load criteria shown on Drawings.

B. Provide precast concrete handholes for installation and pulling cables, changes in direction of ductbanks and cabling, and terminating and splicing cabling. Precast concrete handholes include miscellaneous handholes, junction boxes, pull boxes, and termination points for power, communication, and signal wiring. Their interior dimensions are up to a nominal 48 inches by 48 inches by 48 inches, with fixed covers, but without maintenance holes rings or steel handhole lids. Provide where shown on Drawings.

C. Handholes shall be designed and constructed to accommodate the load criteria shown on Drawings.

D. Provide integrally formed floors and walls. Provide watertight seal using keyed cover and neoprene or butyl sealing strip with mastic backing.

E. Provide cutouts or blockouts for ductbank and conduit entry, or at Contractor's option, field cut openings for ductbanks and conduits.

F. Handholes shall be manufactured by Jensen.

PART 3 - EXECUTION

3.1 SECURING PROJECT SITE WORK

A. Contractor is solely responsible for securing electrical Project Site Work with adequate barriers, warning indicators, and shoring.

3.2 EXCAVATIONS

A. Excavations shall be as required for installation intended or as shown on Drawings.

B. The excavation bottom shall be free of debris and graded smooth.

3.3 BACKFILL AND COMPACTION

A. Backfill around vaults to be free of debris larger than 2 inches in every direction to 1 foot from vault.

B. Bedding for maintenance holes shall be 24 inches of 3/4 inch crushed rock in conformance with RS Subsection 200-1, Table 200-1.2.1 (A).

C. Other backfill and compaction shall be in conformance with TRENCHING AND BACKFILLING Section.

3.4 PRECAST CONCRETE MAINTENANCE HOLES

A. Seal joints of conduits or ductbanks that enter or leave maintenance holes to ensure water tightness.

B. Cables routed through maintenance holes shall be securely fastened to the walls, so as to support the weight of the cables and to provide separation between circuits. Where circuits of different voltage ratings occupy the same maintenance hole, comply with City of Los Angeles Electrical Code requirements for permanently and effectively separating the conductors of the various systems.

C. Lift points and joints between precast elements shall be thoroughly wetted and then completely filled with mortar, smoothed, and sealed both inside and out, to ensure water tightness.

D. In precast sections where steel loops have been provided in lieu of lift holes, remove loops flush with the inside wall surface. No short cutoff protrusions shall be permitted. If concrete spalling occurs as a result of the loop removal, restore the spalled area with mortar to a uniformly smooth surface.

E. Provide precast concrete maintenance holes complete with accessories, sumps, drain facilities, and strengths as required. Identify each casting by having the manufacturer's name and address cast into an interior face or permanently attached thereto. The complete assembly, including neck, collar, frame, and cover shall accommodate the load criteria shown on Drawings. Submit manufacturer's certificate of compliance with requirements.

F. Install and seal precast sections in conformance with manufacturer's written instructions. Install maintenance holes plumb. Use precast neck and shaft sections to bring maintenance holes cover to finished elevation.

G. Attach cable racks to inserts after maintenance holes installation is complete.

H. Core drill or saw cut conduit entrances into existing maintenance holes. Provide a bell end into the maintenance hole panel. Completely seal around the conduit penetrations.

I. Install additional cable racks in existing maintenance holes as required for the cables being installed. Set racks and inserts on not greater than 36 inch centers.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Rigid galvanized steel conduit and fittings

## 1.2 RELATED SECTIONS

A. Section 05 05 14 - Treating Damaged Galvanizing

B. Section 26 00 01 - Basic Electrical Materials and Methods

C. Section 26 05 45 - Underground Electrical Work

D. Section 26 05 53 - Identification for Electrical Systems

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC).

B. ASTM A90/A90M - Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.

C. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Metal Conduit and Intermediate Metal Conduit.

D. UL 6 - Electrical Rigid Metal Conduit-Steel.

## 1.5 SUBMITTALS

A. Submit the following to Engineer:

1. Cut sheets for rigid galvanized steel conduit, PVC coated rigid galvanized steel conduit, and fittings.

## PART 2 - PRODUCTS

### 2.1 CONDUIT

A. Conduit shall comply with the requirements of UL 6 for rigid galvanized steel electrical conduit and each piece shall bear Underwriters Laboratories, Incorporated (UL) label. In case of conflict between UL standards and Specifications, the more stringent requirements shall apply.

B. Conduit shall be City of Los Angeles Department of Building and Safety approved or meet requirements of a recognized testing laboratory approved by City of Los Angeles Department of Building and Safety.

C. Conduit shall conform to ANSI C80.1.

D. Couplings, fittings, and adapters shall be of the same material and size as the conduit.

E. Plastic spacers for direct burial or concrete encasement shall be of size required to fit conduit and as manufactured by Carlon Products.

F. Coat rigid galvanized steel conduit with a 40 mil PVC bonded coating for outdoor installation.

G. Minimum size of conduits shall be 3/4 inch.

### 2.2 ZINC COATING

A. Galvanized steel conduit, bends, and couplings shall be coated by the hot-dip process. Other processes, such as metal spray, high zinc coatings, or cold galvanizing, may not be substituted for hot-dipped galvanizing either in whole or in part.

B. Apply galvanizing to produce a smooth, uniform coating.

C. The weight of zinc coating shall not be less than 1.0 ounce per square foot on the outside and 1.0 ounce per foot of zinc on the inside of the conduit, conduit bends, and couplings.

D. The outside and inside surface shall be tested separately.

E. The determination of the weight of zinc coating shall be done in conformance with ASTM A90/A90M.

F. Conduit shall be pliable and free from brittleness after galvanizing. When a sample is bent to a semicircle with an inner radius of 6 times nominal internal diameter, the steel shall not crack, the welded joints shall not open, nor the zinc coating crack, flake, or be removable by rubbing with the bare fingers.

G. Repair damaged galvanizing in conformance with TREATING DAMAGED GALVANIZING Section.

2.3 PVC COATED CONDUIT

A. Where indicated on Drawings, use Ocal PVC coated rigid galvanized conduit as manufactured by Thomas and Betts Corporation.

B. PVC coated conduit shall conform to NEMA RN 1 with a urethane interior coating.

C. Conduit threads shall be factory made and galvanized. No field threading permitted.

D. Fittings, couplings, elbows, and adapters shall be of the same materials and manufacturer as the conduit.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Exercise care in bending conduit to prevent damage to the conduit.

B. The radius of the curve of the inner edge of a field bend shall not be less than 6 times the internal diameter of the conduit and the internal diameter of the conduit at the bend shall not be reduced.

C. A run of conduit between pole and pole, between fitting and fitting, between box and box, between box and fitting, between box and pole, or between pole and fitting shall not contain more than the equivalent of four-90 degree bends (360 degrees total), including those bends located immediately at the outlet or fitting, in compliance with City of Los Angeles Electrical Code requirements.

D. End of conduit shall be reamed to remove rough edges and where a conduit enters a box or other fittings. Use approved hot-dipped galvanized bushing and locknut to protect the wire from the abrasion unless the design of box and fitting accomplishes the equivalent purposes.

E. Install conduit as a complete, continuous system, mechanically and electrically connected to boxes and fittings. Boxes and fittings shall be connected to provide electrical continuity.

F. Conduit shall be jointed with UL listed couplings and unions. Right angle bends, offsets and change-in-direction bends shall be made with hickey or power bends, standard elbows, conduit fittings, or pull boxes. Conduit runs shall be uniform and symmetrical. Joints in conduit installed in concrete or earth, or exposed to the weather shall be liquid and gas tight.

G. Install conduit runs which extend through areas of different temperature or atmospheric conditions, or which are partially indoors and partially outdoors, in a manner which shall prevent drainage of condensed or entrapped moisture into pull boxes, cabinets, or equipment. Drill overhead fittings at point of entry to box or cabinet.

H. Conduit runs for direct burial or concrete encasement shall have plastic spacers at not more than 5'-0" on centers. Install spacers on firm bearing surfaces before backfilling or concrete encasement.

I. Conduit runs which cross concrete structure joints shall have conduit expansion fittings.

J. Clean and swab conduit runs to remove foreign matter and moisture prior to pulling in wire or cable. Boxes in which conduits terminate shall be cleaned of foreign matter and threads. Leave boxes broom clean upon completion.

K. Mandrel and swab conduit runs to remove foreign matter and moisture prior to pulling in wire and cable. Boxes in which conduits terminate shall be cleaned of foreign matter and threads. Leave boxes broom clean upon completion.

L. Install PVC coated conduit with tools specifically designed to prevent damage to PVC coating.

M. Damage to PVC coatings shall be repaired in conformance with manufacturer's written instructions or the component parts shall be replaced with undamaged components.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. PVC conduit and fittings

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 05 41 - Rigid Galvanized Steel Conduit

C. Section 26 05 45 - Underground Electrical Work

D. Section 26 05 53 - Identification for Electrical Systems

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASME B1.20.1 - Pipe Threads, General Purpose, Inch.

B. ASTM D1784 - Standard Classification System and Basis for Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.

C. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

1.5 SUBMITTALS

A. Submit the following to Engineer:

1. Cut sheets for PVC conduit and fittings.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Conduit, fittings, and bends shall be of the schedules noted on Drawings, but in no case lighter than Schedule 40.

B. Conduit bends shall be of same schedule as conduit straight runs as shown on Drawings.

C. Conduit color is not important, except that conduit installed where visible shall be of the same color materials.

D. Couplings, fittings, and adapters shall be of the same materials as the conduit manufacturer.

E. Primer, solvent, sealing, and joining compounds shall be as recommended by the conduit manufacturer.

F. Conduit and fittings shall be made from clean, virgin, Type II, Grade 1, PVC resin conforming to ASTM D1784.

G. Dimensions and tolerances shall conform to requirements for rigid PVC conforming to both ASTM D1784 and ASTM D1785.

H. Each piece shall be City of Los Angeles Department of Building and Safety approved or meet requirements of a recognized testing laboratory approved by City of Los Angeles Department of Building and Safety.

I. Plastic spacers for direct burial or concrete encasement shall be of size required to fit conduit and shall be as manufactured by Carlon Products.

J. Materials shall contain labels as may be required by City of Los Angeles Electrical Code.

K. Joints between PVC and PVC or between PVC conduit and PVC-coated steel conduit shall be socket-type solvent weld or threaded fittings.

L. Minimum size of conduits shall be 3/4 inch, unless noted otherwise on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Join PVC conduit using socket type solvent weld or threaded fittings and in conformance with manufacturer's written instructions.

B. Cut conduit square and externally chamfer approximately 10 to 15 degrees. Remove burrs and fins.

C. Exercise care not to place stress on previously made joints. Allow to set before handling according to air temperature as follows:

| Air Temperature | Minimum Set Time |
|---|---|
| | |
| 60 degrees to 100 degrees Fahrenheit | 30 minutes |
| below 60 degrees Fahrenheit | 60 minutes |

D. Apply primer and solvent to ends in a manner such that no material is deposited on the interior surface or extruded into the interior during jointing. Excess cement on the exterior of the joint shall be wiped clean immediately after assembly.

E. Threads for plastic conduit shall be as specified in ASME B1.20.1. Install a plug in the bore to prevent distortion prior to threading.

F. Threaded fittings used for joints shall be made using Teflon tape or other approved jointing material. Solvent shall not be used with threaded fittings.

G. Protect conduit from tool damage during assembly. Vises shall have padded jaws and strap wrenches shall be used for installation of fittings and nipples.

H. Remove and replace conduit which has been nicked, scarred, or otherwise damaged at no additional cost to Department.

I. Conduit runs for direct burial or concrete encasement shall have plastic spacers spaced at not more than 5'-0" on center. Install spacers on firm bearing surfaces before backfilling or concrete encasement.

J. PVC conduit runs shall contain a grounding conductor.

K. The last 10 feet of buried conduit shall be galvanized steel conduit with PVC coating as called for on Drawings.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Underground electrical Work

B. Plastic utility duct

C. Moisture sealing materials

D. Underground electrical Work shall be in conformance with City of Los Angeles Department of Water and Power (LADWP) Distribution Division Underground Conduit and Substructures Specifications for Contractors available at: https://apps.engineering.lacity.gov/techdocs/abh/2019CommercialServiceConstructionStandards.pdf.

E. Underground electrical Work shall be in conformance with City of Los Angeles Department of Water and Power (LADWP) Distribution Engineering Section Guidelines for Underground Electric Distribution Construction in Areas where soil gas is present for Contractors available at: https://apps.engineering.lacity.gov/sites/g/files/wph726/f/2019%20LADWP%20CSCS%20H242%20Hazardous%20Gas%20Mitigation.pdf.

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 05 26 - Grounding and Bonding for Electrical Systems

C. Section 26 05 35 - Concrete Pull Boxes

D. Section 26 05 41 - Rigid Galvanized Steel Conduit

E. Section 26 05 42 - PVC Conduit

F. Section 26 05 53 - Identification for Electrical Systems

G. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM F512 - Standard Specification for Smooth-Wall Poly(Vinyl Chloride) (PVC) Conduit and Fittings for Underground Installation.

B. CPUC GO 128 - Public Utilities Commission of the State of California Rules for Construction of Underground Electric Supply and Communication Systems.

C. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Metal Conduit and Intermediate Metal Conduit.

D. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit.

E. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing.

F. NEMA BI 50063 - Polyvinyl Chloride (PVC) Plastic Utilities Duct for Underground Installations.

G. NEMA TC 9 - Fittings for Polyvinyl Chloride (PVC) Plastic Utilities Duct for Underground Installation.

H. NFPA 70 - National Electrical Code.

I. UL 6 - Electrical Rigid Metal Conduit-Steel.

J. UL 514A - Metallic Outlet Boxes.

K. UL 514B - Conduit, Tubing, and Cable Fittings.

L. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings.

1.5 SUBMITTALS

A. Submit the following to Engineer for approval:

1. Product Data:

a. Conduit/Duct (all types)

b. Precast Maintenance Holes

c. Sealing Material for Precast Maintenance Holes

d. Maintenance Holes Frames and Covers

2. Shop Drawings:

    a. Precast Maintenance holes: Indicate dimensions, reinforcement, size, and locations of openings, and accessory locations for precast maintenance holes.

    b. Submit structural calculations for precast concrete items as follows:

        1) Submit structural calculations for loads including traffic, soil pressure, and live loads.

        2) Submit buoyancy calculations based on water table at 5 feet below grade. Products shall have a buoyancy safety factor of 1.5 minimum.

        3) The calculations shall include a statement by the structural engineer that products are suitable for use in Seismic Zone 4 as defined by City of Los Angeles Building Code.

3. Certificates:

    a. Material and Equipment: Provide manufacturer's statement certifying that the product supplied meets or exceeds Contract requirements.

        1) Precast maintenance hole and accessories.

    b. For electrical medium and high voltage splicing installer provide the following:

        1) State of California Journeyman license

        2) IBEW-NECA cable splicing certification

4. Details, installation procedures, sequence of Work, and supporting information to intercept electrical medium and high voltage lines.

    a. References from 3 clients where high voltage intercepting was completed. Provide description of Work and estimated value of Work.

1.6 QUALITY ASSURANCE

A. In each standard referenced to in this Section, consider the advisory provisions to be mandatory, as though the word "shall" has been substituted for "should" wherever it appears.

B. Electrical medium and high voltage splicing shall be installed by a qualified installer with at least 10 years of experience in this type of Work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to Project Site under provisions of BASIC SITE MATERIALS AND METHODS Section. Inspect for damage.

B. Store and protect in conformance with manufacturer's written instructions.

1.8 PROJECT CONDITIONS

A. Drawings are diagrammatic and shall not be scaled for exact locations. Locations of existing underground utilities are based on record drawings and casual field observations. Contractor shall use care in excavating for the installation of new underground ducts and shall be responsible for damage to existing underground utilities. Field conditions and non-interference with other utilities and trades, shall determine exact locations of new underground electrical ducts.

B. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

1.9 PROJECT RECORD DOCUMENTS

A. Submit under provisions of PROJECT RECORD DOCUMENTS Section.

B. Accurately record actual locations of exact routing of duct bank indicating plan location and depths every 50 linear feet. Measure conduit locations from permanently fixed readily discernible landmarks such as building corners, columns, maintenance hole centerline.

C. Accurately record actual locations of each maintenance hole.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and equipment shall be new and of high quality to give long life and reliable operation. Equipment shall be modern in design and shall not have been in prior service except as required by factory tests. Materials and equipment shall conform to the respective specifications and standards of this Section. Electrical ratings shall be as indicated on Drawings.

B. Concrete for encasement shall be in conformance with BASIC MATERIALS AND METHODS Section.

2.2 CONDUIT

A. Rigid Metal Conduit: UL 6, hot-dip galvanized, threaded type.

B. PVC Coated Rigid Steel Conduit: NEMA RN 1.

C. Rigid Plastic Conduit: NEMA TC 2; Schedule 40 PVC.

2.3 PLASTIC DUCT

A. Concrete Encased Plastic Utilities Duct: UL 651: Schedule 40 Rigid PVC Conduit.

B. Concrete Encased Plastic Telecommunication Duct: UL 651: Schedule 40 Rigid PVC Conduit.

2.4 FITTINGS AND OUTLET BOXES

A. Metal Fittings and Outlet Boxes: UL 514A and UL 514B. Fittings and boxes for use with steel conduit, rigid or flexible shall be cast-metal with gasketed closures.

B. PVC Fittings and Conduit Bodies: NEMA TC 3.

C. Plastic Utility Duct Fittings: NEMA BI 50063, NEMA TC 9, and ASTM F512.

2.5 NYLON PULL TAPE

A. Nylon pull tape shall be nylon having a minimum tensile strength of 1,250 pounds in each empty duct. Minimum 48 inches of slack shall be left at each end of nylon pull tape. Plug spares for future use.

2.6 CABLE SUPPORTS

A. Provide a means of supporting cables running through electrical maintenance holes. This shall be in the form of vertical channels cinch anchored to the maintenance holes wall. A cantilevered support fastened to the channels shall be used to support the cable and splices. Cable racks, including rack arms and insulators, shall be adequate to accommodate the cable. A porcelain clamp shall be used to insulate and protect cables from supports. Cables smaller than 0.75 inch diameter shall be provided with supplementary means of support such as cable tray or conduit. Exposed metal parts and fasteners shall be fabricated of stainless steel or double hot-dip galvanized steel.

2.7 MOISTURE SEALING MATERIAL

A. Provide a 2-part urethane foam sealant which when mixed shall expand approximately 15 times in volume to form a dense, strong, tough foam unit with density of 3 to 4 pounds per cubic foot. Sealant shall reach 60 percent full strength in 8 to 10 minutes after application.

2.8 GROUNDING

A. Grounding shall conform to City of Los Angeles Electrical Code NFPA 70 Section 250.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Underground cable installation shall conform to NFPA 70, CPUC GO 128, and other state codes and City of Los Angeles Electrical Code.

3.2 CONCRETE

A. Concrete for electrical requirements shall be at least 3,000 pounds per square inch (psi) concrete with 1-inch aggregate and in conformance with CONCRETE FOR EXTERIOR IMPROVEMENTS Section, unless otherwise noted on Drawings.

3.3 UNDERGROUND DUCT

A. The duct bank shall be rectangular in cross-section and shall provide at least 3 inches of concrete cover surrounding the bank. Separate conduits by a minimum concrete thickness of 3 inches.

B. Provide a minimum of 12 inches of separation between low voltage conduits from high voltage conduits.

C. Provide a minimum of 6 inches of separation between utility crossings.

D. Sweep bends may be made up of 1 or more curved or straight sections or combinations thereof. Manufactured bends shall have a minimum radius of 60 inches for ducts of 2 inches in diameter and larger.

E. Use suitable spacers of high impact polystyrene installed not greater than 4 feet on center.

F. During construction, protect partially completed duct lines from the entrance of debris such as mud, sand, and dirt by means of suitable conduit plugs.

G. Conduit Termination to Maintenance Holes: Conduits shall terminate into maintenance hole and pull box terminators. Immediately after installation, plug or cap raceway ends with water-tight and dust-tight seals until the time for pulling in conductors.

H. Concrete Envelope: Securely anchor duct to prevent movement during concrete or slurry placement.

I. Underground Warning Tape: Identifying tapes shall be buried in utility line trenches. Place 1 tape above the centerline of each duct bank. Refer to IDENTIFICATION FOR ELECTRICAL SYSTEMS Section.

J. Conduit Stub-up through Concrete Slab or Grade: Install raceways so that they emerge at right angles to the surface and have no curved portion of the bend exposed. Provide support during pouring of concrete to ensure that raceways remain in position. Provide PVC coated galvanized rigid steel elbows and nipples where conduit emerges from slab of concrete or grade. This requirement is for slabs and grades, regardless of whether it is permanently exposed to view or not.

3.4 PREPARATION FOR PULLING IN CONDUCTORS

A. Do not install crushed or deformed raceways. Avoid traps in raceways where possible. Take care to prevent the lodging of concrete, dirt, or trash in raceways, boxes, fittings, and equipment during the course of construction. Make raceways entirely free of obstructions or replace them. Ream raceways, remove burrs, and clean raceway interior before introducing conductors or pull wires. Conduit shall be clear of particles of earth, sand, and gravel.

B. Existing and new raceways shall be successfully mandrelled with a 12 inch long mandrel in the presence of Inspector. After successful mandrelling of raceways, pull a bristle brush though each raceway to remove debris.

C. For existing raceways to be used in Contract, pull a mandrel of a diameter approximately 1/2 inch less than the raceway inside diameter through each raceway. Provide nylon pull tape to be used for conductor paths.

D. For new concrete-encased raceways, after the concrete envelope has set, mandrel each completed section of a duct line from maintenance hole to maintenance hole. Pull a mandrel of a diameter approximately 1/4 inch less than the raceway inside diameter through each raceway.

## 3.5 EMPTY RACEWAYS

A. Certain raceways shall have no conductors pulled in as part of Contract. Identify with tags at each end and at any intermediate pull point the origin and destination of each such empty raceway. Provide a removable permanent cap over each end of each empty raceway. Provide a 3/8 inch nylon pull cord in each empty raceway.

## 3.6 GROUNDING

A. Grounding shall be in conformance with City of Los Angeles Electrical Code NFPA 70 Section 250.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Electrical systems identification

## 1.2 RELATED SECTIONS

A. Section 33 05 97.23 - Underground Utility Warning Tape

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. 29 CFR 1910.145 - Accident Prevention Signs and Tags.

B. ASME A13.1 - Scheme for the Identification of Piping Systems.

C. NFPA 70 - National Electrical Code.

## 1.5 SUBMITTALS

A. Shop Drawings: Dimensioned plans and sections or elevation layouts of electrical equipment.

## 1.6 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with NFPA 70.

## 1.7 COORDINATION

A. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.

B. Where electrical identification markings and devices shall be concealed by acoustical ceilings and similar finishes, coordinate installation of these items before ceiling installation.

PART 2 – PRODUCTS

2.1 ELECTRICAL IDENTIFICATION

A. Identification Devices: A single type of identification product for each application category. Use colors prescribed by ASME A13.1, NFPA 70, and this Section.

B. Raceway and Cable Labels: Comply with ASME A13.1, Table 3, for minimum size of letters for legend and minimum length of color field for each raceway and cable size.

1. Type: Pretensioned, wraparound plastic sleeves. Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the item identified.

2. Type: Preprinted, flexible, self-adhesive, vinyl. Legend is overlaminated with a clear, weather- and chemical-resistant coating.

3. Color: Black letters on orange background.

4. Legend: Indicates voltage.

5. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape, not less than 1 inch wide by 3 mils thick.

C. Install underground utility warning tape in conformance with UNDERGROUND UTILITY WARNING TAPE Section.

D. Tape Markers for Wire: Vinyl or vinyl cloth, self-adhesive, wraparound type with preprinted numbers and letters.

1. Color Coding Cable Ties: Type 6/6 nylon, self locking type. Colors to suit coding scheme.

E. Engraved Plastic Labels, Signs, and Instruction Plates: Engraving stock, melamine plastic laminate punched or drilled for mechanical fasteners 1/16-inch minimum thickness for signs up to 20 square inches and 1/8-inch minimum thickness for larger sizes. Engraved legend in black letters on white background.

F. Interior Warning and Caution Signs: Comply with 29 CFR 1910.145. Preprinted, aluminum, baked enamel finish signs, punched or drilled for mechanical fasteners, with colors, legend, and size appropriate to the application.

G. Exterior Warning and Caution Signs: Comply with 29 CFR 1910.145. Weather resistant, nonfading, preprinted, cellulose acetate butyrate signs with 0.0396 inch galvanized steel backing, with colors, legend, and size appropriate to the application. Use 1/4-inch grommets in corners for mounting.

H. Fasteners for Nameplates and Signs: Self tapping, stainless steel screws, or No. 10/32 stainless steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 IDENTIFICATION INSTALLATION

A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in Contract Documents or required by codes and standards. Use consistent designations throughout Project.

C. Self-Adhesive Identification Products: Clean surfaces before applying.

D. Identify raceways and cables with color banding.

E. Bands: Pretensioned, snap around, colored plastic sleeves, or colored adhesive marking tape. Make each color band 2 inches wide, completely encircling conduit, and place adjacent bands of 2 color markings in contact, side by side.

1. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

2. Colors:

a. Fire Alarm System: Red

b. Security System: Blue and yellow

c. Telecommunication System: Green and yellow

F. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color coding may be used for voltage and phase identification.

G. Install continuous underground plastic markers directly above power and communication lines during trench backfilling, for exterior underground power, control, signal, and communication lines. Locate 6 to 8 inches below finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches overall width, use a single line marker.

1. Color code 240/120V and 208/120V system secondary service, feeder, and branch circuit conductors throughout the secondary electrical system as follows:

a. Phase A: Black

b. Phase B: Red

c. Phase C: Blue

d. Neutral: White

2. Color code 480/277-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:

a. Phase A: Yellow

b. Phase B: Brown

c. Phase C: Orange

d. Neutral: Gray

H. Install warning, caution, and instruction signs in conformance with City of Los Angeles Electrical Code NFPA 70 Section 490 and where needed to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal backed butyrate signs for outdoor items.

I. Install engraved laminated emergency operating signs with white letters on red background with minimum 3/8-inch high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Electrical system analysis

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. 29 CFR 1910 - Occupational Safety and Health Standards.

B. IEEE 242 - IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.

C. IEEE 399 - IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis.

D. IEEE 1584 - IEEE Guide for Performing Arc-Flash Hazard Calculations.

E. IEEE C57.12.00 - IEEE Standard for General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.

F. IEEE C57.12.01 - IEEE Standard for General Requirements for Dry-Type Distribution and Power Transformers.

G. NEMA Z535.4 - Product Safety Signs and Labels.

H. NFPA 70 - National Electrical Code.

I. NFPA 70E - Standard for Electrical Safety in the Workplace.

1.5 SUBMITTALS

A. Submit to Engineer the following:

1. Short circuit study.

2. Protective Device Coordination Study: Submit within 90 days after approval of short circuit study.

3. Arc flash study.

4. Arc flash warning labels.

1.6 QUALITY ASSURANCE

A. Short circuit and protective device coordination and arc flash studies shall be prepared by a professional electrical engineer registered in the State of California.

1.7 SEQUENCING AND SCHEDULING

A. Initial complete short circuit study shall be submitted and reviewed before Engineer shall review shop drawings for medium and low voltage switchgear, low voltage switchboards, panelboards, and automatic transfer switch.

B. Initial complete protective device coordination and arc flash studies shall be submitted within 90 days after approval of initial short circuit study.

C. Revised short circuit, protective device coordination, arc flash studies, and arc flash labels shall be submitted 30 days before energizing electrical equipment.

D. Final short circuit, protective device coordination, and arc flash studies shall be completed prior to Project substantial completion. Final version of study shall include as-installed equipment, materials, and parameter data or settings entered into equipment based on study.

E. Submit final arc flash labels described herein and in compliance with NEMA Z535.4 prior to Project Substantial Completion.

1.8 GENERAL STUDY REQUIREMENTS

A. Equipment and component titles used in the studies shall be identical to equipment and component titles shown on Drawings.

B. Perform studies using following software:

1. Easy Power.

C. Perform complete fault calculations for each existing, proposed, and ultimate source combination.

1. Source combination may include present and future power company supply circuits, large motors, or generators.

2. Motor contribution, unless specifically known and defined, shall be based upon a percentage of peak coincident load for low voltage transformer applications per recommended standards. Identify assumptions, standards, and percentages.

D. Use proposed and existing load data for study obtained from Contract Documents and revised system configuration, wiring information, and equipment.

E. Existing System and Equipment:

1. Extent of existing system to be included in study is limited to system elements that affect new system and equipment and as shown on Drawings.

2. Include fault contribution of existing motors and equipment in study.

3. Include impedance elements that affect new system and equipment.

4. Include protective devices in series with new equipment.

F. Device coordination time-current curves for medium and low voltage distribution system; include individual protective device time-current characteristics.

1.9 SHORT CIRCUIT STUDY

A. General:

1. Prepare in conformance with IEEE 399.

2. Use cable impedances based on copper conductors.

3. Use bus impedances based on copper bus bars.

4. Use cable and bus resistances calculated at 25 degrees C.

5. Use medium-voltage cable reactances based on use of typical dimensions of shielded cables with 133 percent insulation levels.

6. Use 600 volt cable reactances based on use of typical dimensions of THWN conductors.

7. Use transformer impedances minimum 98.5 percent of “nominal” impedance based on tolerances specified in IEEE C57.12.00. Use actual nameplate impedance when available.

B. Provide:

1. Calculation methods and assumptions.

2. Typical calculation.

3. Tabulations of calculated quantities.

4. Results, conclusions, and recommendations.

5. Selected base per unit quantities.

6. One-line diagrams.

7. Source impedance data, including electric utility system and motor fault contribution characteristics.

8. Impedance diagrams.

9. Zero-sequence impedance diagrams.

C. Calculate short circuit interrupting and momentary (when applicable) duties for an assumed 3-phase bolted fault at each:

1. Electric utility’s supply termination point.

2. Medium Voltage switchgear (metal-clad and metal-enclosed switchgear).

3. Low-voltage switchboards, panelboards, and automatic and manual transfer switches.

4. Branch circuit panel boards where shown on Drawings.

5. Future load contributions as shown on one-line diagram.

D. Provide bolted line-to-ground fault current study for areas as defined for 3-phase bolted fault short circuit study.

E. Provide bolted line-to-line fault current study for areas as defined for 3-phase bolted fault short circuit study.

F. Verify:

1. Equipment and protective devices are applied within their ratings.
2. Adequacy of medium and low voltage switchgear, primary junctions, low voltage switchboard, and panelboards bus bars to withstand short circuit stresses.
3. Adequacy of transformer windings to withstand short circuit stresses.
4. Cable sizes for ability to withstand short circuit heating, in addition to normal load currents.

G. Tabulations:

1. General Data:
   a. Short circuit reactances of rotating machines.
   b. Cable and conduit material data.
   c. Bus data.
   d. Transformer data.
   e. Circuit resistance and reactance values.
2. Short Circuit Data for each source combination:
   a. Fault impedances.
   b. X to R ratios.
   c. Asymmetry factors.
   d. Motor contributions.
   e. Short circuit kVA.
   f. Symmetrical and asymmetrical fault currents.
3. Equipment Evaluation:
   a. Equipment bus bracing, equipment short circuit rating, transformer, and cable.

b. Maximum fault current available.

H. Written Summary:

1. Scope of studies performed.

2. Explanation of bus and branch numbering system.

3. Prevailing conditions.

4. Selected equipment deficiencies.

5. Results of short circuit study.

6. Comments or suggestions.

I. Suggest changes and additions to equipment rating and/or characteristics.

J. Notify Engineer in writing of existing circuit protective devices improperly rated for new fault conditions.

K. Revise data for “as-installed” condition. Revise study with “as-installed” data.

1.10 PROTECTIVE DEVICE COORDINATION STUDY

A. General:

1. Prepare in conformance with IEEE 242.

2. Proposed protective device coordination time-current curves for distribution system, graphically displayed on conventional log-log curve sheets.

a. Provide separate curve sheets for phase and ground fault coordination for each scenario.

b. Each curve sheet to have title and one-line diagram that applies to specific portion of system associated with time-current curves on that sheet. Limit number of devices shown to 4 to 6.

c. Identify device associated with each curve by manufacturer type, function, and, if applicable, recommended tap, time delay, instantaneous, and other settings recommended.

d. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which device is exposed.

e. Apply motor protection methods that comply with NFPA 70.

B. Plot Characteristics on Curve Sheets:

1. Electric utility's relays.

2. Electric utility's fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.

3. Medium-voltage equipment relays.

4. Medium-voltage and low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.

5. Low-voltage equipment circuit breaker trip devices, including manufacturers' tolerance bands.

6. Pertinent transformer full-load currents at 100 percent.

7. Transformer magnetizing inrush currents.

8. Transformer damage curves; appropriate for system operation and location.

9. American National Standards Institute (ANSI) transformer withstands parameters.

10. Significant symmetrical and asymmetrical fault currents.

11. Ground fault protective device settings.

12. Other system load protective devices for largest branch circuit and feeder circuit breaker in each motor control center.

C. Primary Protective Device Settings for Delta-Wye Connected Transformer:

1. Secondary Line-to-Ground Fault Protection: Primary protective device operating band within transformer's characteristics curve, including a point equal to 58 percent of IEEE C57.12.00 withstand point.

2. Secondary Line-To-Line Faults: 16 percent current margin between primary protective device and associated secondary device characteristic curves.

D. Separate medium voltage relay characteristics curves from curves for other devices by at least 0.4 second time margin.

E. Tabulate Recommended Protective Device Settings:

1. Relays:
    a. Current tap.
    b. Time dial.
    c. Instantaneous pickup.
    d. Electronic settings data file.
2. Circuit Breakers:
    a. Adjustable pickups.
    b. Adjustable time-current characteristics.
    c. Adjustable time delays.
    d. Adjustable instantaneous pickups.
    e. I^2t In/Out.
    f. Zone interlocking.
    g. Electronic settings data file.

F. Written Summary:

1. Scope of studies performed.
2. Summary of protective device coordination methodology.
3. Prevailing conditions.
4. Selected equipment deficiencies.
5. Results of coordination study.
6. Appendix of complete relay and circuit breaker electronic setting files submit electronic data files from manufacturer’s software.
7. Comments or suggestions.

## 1.11 ARC FLASH STUDY

A. Perform arc flash hazard study after short circuit and protective device coordination study has been completed, reviewed, and accepted by Engineer.

B. Perform arc flash study in conformance with NFPA 70E, 29 CFR 1910 Subpart S, and IEEE 1584.

C. Visually field verify data to “as-installed” condition.

D. Base Calculation: For each major part of electrical power system, determine the following:

1. Flash hazard protection boundary.
2. Limited approach boundary.
3. Restricted approach boundary.
4. Prohibited approach boundary.
5. Incident energy level.
6. Personal protection equipment (PPE) hazard/risk category.
7. Type of PPE required.

E. Produce arc flash warning labels that list items specified in Base Calculation Paragraph of this Article, and the following additional items.

1. Bus name.
2. Bus voltage.

F. Produce bus detail sheets that list items specified in Base Calculation Paragraph of this Article, and the following additional items:

1. Bus name.
2. Upstream protective device name, type, and settings.
3. Bus line-to-line voltage.

G. Produce arc flash evaluation summary sheet listing the following additional items:

1. Bus name.

2. Upstream protective device name, type, settings.
3. Bus line-to-line voltage.
4. Bus bolted fault.
5. Protective device bolted fault current.
6. Arcing fault current.
7. Protective device trip/delay time.
8. Breaker opening time.
9. Solidly grounded column.
10. Equipment type.
11. Gap.
12. Arc flash boundary.
13. Working distance.
14. Incident energy.
15. Required protective fire rated clothing type and class.

H. Analyze short circuit, protective device coordination, and arc flash calculations and highlight equipment that is determined to be underrated or causes incident energy values greater than 40 cal/cm^2. Propose approaches to reduce energy levels.

I. Prepare report summarizing arc flash study with conclusions and recommendations which may affect integrity of electric power distribution system. As a minimum, include the following:

1. Equipment manufacturer’s information used to prepare study.
2. Assumptions made during study.
3. Reduced copy of single-line drawing; 11 inches by 17 inches maximum.
4. Arc flash evaluations summary spreadsheet.
5. Bus detail sheets.

PART 2 - PRODUCTS

2.1 ARC FLASH WARNING LABELS

A. Printed in multicolor on adhesive backed labels. An example label Figure 1 is located at the end of this Section.

B. Labels shall be On-Line Labels, Model OL172LP.

PART 3 - EXECUTION

3.1 GENERAL

A. Adjust relay and protective device settings according to values established by coordination study.

B. Make minor modifications to equipment as required to accomplish conformance with short circuit and protective device coordination studies.

C. Notify Engineer in writing of required major equipment modifications.

D. Provide laminated single-line diagrams (minimum size 11 inches by 17 inches) to post on interior of electrical room or switchgear doors.

E. Install arc flash warning labels on equipment as specified in this Section.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Backboards for mounting electrical equipment

1.2 RELATED SECTIONS

A. Section 09 90 01 - Painting for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. PS 1 - Structural Plywood.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Marine plywood shall be B-B MDO Face Group 1 Exterior in conformance with The Engineered Wood Association (APA) and U.S. Product Standard PS 1 requirements.

B. Wood screws shall be No. 7 flathead Phillips zinc plated steel wood screws.

PART 3 - EXECUTION

3.1 FABRICATION

A. The plywood shall be painted on every side before attaching the two 1 inch thick sheets together with finished paint in conformance with PAINTING FOR EXTERIOR IMPROVEMENTS Section.

B. The plywood sheets shall be attached to each other with 1-1/2 inch long No. 7 flathead Phillips zinc plated steel wood screws. See Drawings for locations of screws.

3.2 INSTALLATION

A. Backboard shall be installed in accordance with Drawings.

B. Paint electrical backboards Bridgeport gray.

END OF SECTION

# PART 1 – GENERAL

## 1.1 SECTION INCLUDES

A. Electrical systems and products manufacturer's field engineering services

B. Standards compliance certification

C. Quality assurance

D. Warranty verification

E. Training for electrical switchgear, transformer, and electrical power monitoring

## 1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

## 1.4 SUBMITTALS

A. Contractor shall submit qualifications, Work experience, and resumes for manufacturer’s, engineers, staff, personnel, and representatives that shall be utilized for Work under this Section to Engineer for review and approval. The submittal shall include manufacturer certification that the staff is factory-trained and certified, and are fully authorized to provide required services.

B. Provide “As-Built” Record drawings (AutoCAD and PDF format) including field wiring, modifications and electrical equipment verification inspection report in conformance with PROJECT RECORD DOCUMENTS Section.

## 1.5 QUALITY ASSURANCE

A. Manufacturer’s field engineering staff and product and systems certification engineers assigned to Project shall be as outlined below and shall be factory trained for each of the following functions:

1. Manufacturer’s switchgear engineer(s). Refer to Deliverables and Switchgear, Relays, Transformers, and Neutral Grounding Resistors Articles of this Section for deliverables services.

2. Manufacturer’s electrical power monitoring engineer(s). Refer to Electrical Power Monitoring (EPM), Software, Ethernet Gateways, and Ethernet Devices Article of this Section for deliverable services.

3. Manufacturer’s control software and network engineer(s). Refer to PLC System, SCADA System, and HMI Software Article of this Section for deliverable services.

4. Manufacturer’s project management engineer(s). Refer to Field Engineering Services, Standard Compliance Certification, Quality Assurance, Warranty Verification, and Training Project Management Article of this Section for deliverable services.

1.6 EQUIPMENT AND SYSTEM SUBJECT TO THE REQUIREMENTS OF THIS SECTION

A. Each of the following pieces of the equipment include but is not limited to sub-assemblies, sub-components, wiring, terminations, relays, systems, and networks as shown on approved shop drawings:

1. 38 kV medium-voltage switchgear (metal-clad).

2. Medium-voltage transformer and neutral grounding resistor.

3. 5 kV medium-voltage metal-clad switchgear.

4. 15 kV medium-voltage switchgear (metal-clad and metal-enclosed).

5. Programmable Logic Controller (PLC), Human-Machine Interface (HMI), System Control and Data Acquisition (SCADA) system.

6. Electrical Power Monitoring (EPM) meters, network, network components, software, hardware, and computer server equipment.

7. Verification of equipment interconnect wiring.

8. Interface and interconnection with existing Port-wide power monitoring system.

1.7 WARRANTY

A. Warrant the electrical equipment, systems, products, and services for 1 year commencing from the date of the services completed in manner compliant with Specifications and approved by Engineer.

PART 2 – PRODUCTS

2.1 DELIVERABLES

A. Electrical systems and products manufacturer’s field engineering services, standards compliance certification, quality assurance, warranty verification, and training services shall be provided and performed by the switchgear manufacturer. Contractor shall coordinate and obtain the services of the manufacturer to perform Work under this Section. The manufacturer’s representative(s) shall perform Work as specified under this Section and at the conclusion of such Work shall certify that the equipment and the system have been installed, adjusted, examined, and programmed in conformance with the manufacturer’s written instructions, and that said system(s) are verified to be approved by Engineer, and to begin with applicable warranty.

B. Contractor shall submit a completed report including a checklist of actions taken in conformance with Paragraphs 2.2 A, 2.3 B, 2.4 A through D, and Article 2.5 A indicating the completion of the certification and quality assurance of the detail check Work as indicated in this Specification. The completion report shall be signed by the manufacturer’s field engineering and quality assurance certification personnel performing Work and reviewed and signed by Contractor. Submit this report to Engineer subject to Engineer’s review and approval.

2.2 SWITCHGEAR, RELAYS, TRANSFORMERS, AND NEUTRAL GROUNDING RESISTORS

A. Provide services of a qualified factory-trained switchgear manufacturer’s field engineer to perform services as listed but not limited to the following:

1. Confirm the system has been installed properly and in conformance with manufacturer’s written instructions.

2. Ensure the equipment operates as specified. Check primary and secondary disconnects contacts, trip and close circuits and coils; verify and examine correct operation of relays, emergency trip circuits, backup power sources, switches, notifications and alarms, and circuit breakers.

3. Make any necessary modifications based on observations of Project Site conditions that are different than had been expected.

4. Gather and evaluate initial operational data.

5. Verify correct operation of interfaces between new and existing equipment.

6. Perform visual and mechanical inspection. Verify no damage has occurred during shipment or installation.

7. Verify the equipment nameplate data to ensure proper identification of the equipment in accordance with approved shop drawings.

8. Perform electrical examination to field verify insulation, contact resistance, high potential verification, current path, functionality, and sequencing.

9. Formally document field verification and examination data for record of Work and to provide benchmark for future verification and inspection.

10. Verify equipment and devices are set up in conformance to American National Standards Institute (ANSI) standards and factory recommendations and that they are functional.

11. Calibrate and set the relays for proper operation. Adjust and examine to verify relay settings in conformance with power analysis study and selectivity coordination report.

12. Perform secondary current injection examination.

13. Install the arc flash hazard labels.

14. Check the effectiveness of instrument transformer case or frame grounding by a low potential source, such as 10 volts or less, using bell, buzzers, or lights with an audible or visual indication on the measuring device.

15. Measure and record the resistance of earth ground.

16. Provide the coordination curves for selective tripping of over-current devices. Replace and redraw the curves where required due to substitution of relays, or fuses other than the ones used in the engineering design. Provide exact fusing and relay setting descriptions for each substituted component.

17. Verify the switchgear assembly control wiring assembly by electrically operating the switchgear control devices and components.

18. Examine to ensure that connections between instrument transformers, meters, or relays are correctly connected to polarities. Check instruments for correct direction.

19. Examine sequential operation of devices to ensure that the devices are in the sequence function in conformance with design intent.

2.3 ELECTRICAL POWER MONITORING (EPM), SOFTWARE, ETHERNET GATEWAYS, AND ETHERNET DEVICES

A. The electrical power monitoring (EPM) manufacturer shall provide development, integration, and installation services required to complete and turn over a fully functional system. These systems shall be manufactured by the switchgear manufacturer.

B. Provide services of a qualified factory-trained manufacturer’s EPM personnel to perform services as listed but not limited to the following:

1. Modifications and field adjustments as necessary to existing switchgear and equipment, including component installation

2. Configuration of software, servers, and workstations

3. Communication interface installation and configuration

4. Communication network design, preparation of detail diagrams, drawings, and plans

5. Interface to existing Department port-wide electrical power monitoring and SCADA systems

2.4 PLC SYSTEM, SCADA SYSTEM, AND HMI SOFTWARE

A. PLC and SCADA systems, and HMI software manufacturer shall provide development, integration, and installation services required to complete and turn over a fully functional system. The manufacturer shall certify that the equipment has been installed, adjusted, verified, and inspected in conformance with manufacturer’s written instructions. These systems shall be manufactured by the switchgear manufacturer.

B. Provide services of a qualified factory-trained manufacturer’s control software and network personnel to perform services as listed but not limited to the following:

1. PLC Backpan Engineered Drawings

2. PLC Backpan Verification and Inspection Services

3. PLC Custom Design Configuration and Software Program

C. Custom software and screens to match existing software and screens

1. Programming of PLC

2. PLC/HMI manufacturer’s field engineering services, standards compliance certification, quality assurance, warranty verification, reporting, and training.

3. Configure software on new electrical power monitoring server, located at the user site.

D. Configure software on existing electrical power monitoring server located at Harbor Administration Building.

E. Coordination with Department, Terminal Operator, and tenant's (e.g. vessel) PLC engineers.

2.5 FIELD ENGINEERING SERVICES, STANDARD COMPLIANCE CERTIFICATION, QUALITY ASSURANCE, WARRANTY VERIFICATION, AND TRAINING PROJECT MANAGEMENT

A. Provide services of qualified factory-trained manufacturer’s project management engineer(s) to perform services as listed but not limited to the following:

1. Project Management: A project manager engineer shall be assigned to each EPM implementation. Typical responsibilities shall include coordination of personnel and information, as well as on-site supervision for the various levels and functions of suppliers required for completion of Project. Project management engineer shall provide strategic direction for the entire manufacturer's engineers' team. Responsibilities include daily operational and tactical implementation of projects, provide logistics, and ensure follow up and closure of Project Site related issues.

2.6 PRE-FABRICATION DOCUMENT REVIEW AND AT-FACTORY INSPECTION/WITNESS MEETINGS

A. Contractor shall schedule and coordinate the following 2 meetings. Contractor shall be present with Engineer and manufacturer's representatives engineers at both meetings. Contractor shall include costs for travel (air and ground transportation), lodging, and per diem cost for 2 Department Engineering Division and 1 Department Construction Division staff members for the second of the 2 following meetings:

1. Pre-fabrication document review meeting shall be held to review the switchgear and transformer detailed shop drawings, review the fabrication documentation and coordinate the specification requirements, fabrication details, and delivery schedule with the manufacturer, and Contractor. This meeting shall be held at Harbor Department Administration Building prior to fabrication.

2. At-factory inspection/witness meeting of the electrical switchgear and transformers shall be held during manufacturer's factory verification inspection and prior to shipment. At-factory production verification inspections shall be made available for witness by Engineer. The manufacturer shall supply a factory service technician, verification inspection equipment, and control power source for the length of time required to perform the verification inspections in the presence of Department staff. The manufacturer through Contractor shall notify Engineer 8 weeks prior to the date the verification inspections are to be performed. This meeting shall be held at the factory prior to shipping of equipment.

PART 3 – EXECUTION

3.1 TRAINING SERVICES

A. After acceptance of Work, Contractor shall provide 3 separate 8-hour sessions (3 separate shifts) for a total of 24 hours site training for 12 of Department’s operation personnel. The training session shall be conducted by the manufacturer’s qualified representative, with Contractor present. Training shall include meals and instructions on switchgear operation, switchgear maintenance, electrical power monitoring, operation/programming, protective relay operation, neutral grounding resistor with protective relay, ethernet network communications, PLC/HMI operation, computer server, and other major components.

B. Training shall be conducted at Project Site.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Occupancy Sensors

B. Control Accessories

1.2 RELATED SECTIONS

A. Section 26 05 29 - Hangers and Supports for Electrical Systems

B. Section 26 05 53 - Identification for Electrical Systems

C. Section 26 27 26 - Wiring Devices

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for work in this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. 47 CFR 15 - Radio Frequency Devices.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction.

C. NECA 130 - Standard for Installing and Maintaining Wiring Devices.

D. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

E. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts.

F. NFPA 70 - National Electrical Code.

G. UL 916 - Energy Management Equipment.

H. UL 917 - Clock-Operated Switches.

## 1.5 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the placement of lighting control devices with millwork, furniture, equipment, and the like installed under other sections or by others.

2. Coordinate the placement of wall switch occupancy sensors with actual installed door swings.

3. Coordinate the placement of occupancy sensors with millwork, furniture, equipment or other potential obstructions to motion detection coverage installed under other sections or by others.

4. Coordinate the placement of photo sensors for daylighting controls with windows, skylights, and luminaires to achieve optimum operation. Coordinate placement with ductwork, piping, equipment, or other potential obstructions to light level measurement installed under other sections or by others.

5. Notify Engineer of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with Work.

B. Sequencing:

1. Do not install lighting control devices until final surface finishes and painting are complete.

## 1.6 SUBMITTALS

A. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.

1. Occupancy Sensors: Include detailed motion detection coverage range diagrams.

B. Shop Drawings:

1. Occupancy Sensors: Provide lighting plan indicating location, model number, and orientation of each occupancy sensor and associated system component.

C. Samples:

1. Occupancy Sensors: One for each type and color specified.

D. Field Quality Control Reports.

E. Manufacturer's Written Instructions for Installation: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

F. Operation and Maintenance Data: Include detailed information on device programming and setup.

G. Maintenance Materials: Furnish the following for Department's use in maintenance of project.

H. Project Record Documents: Record actual installed locations and settings for lighting control devices.

1.7 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at Project Site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 3 years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by Occupational Safety and Health Administration (OSHA) as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.8 DELIVERY, STORAGE, AND PROTECTION

A. Store products in a clean, dry space in original manufacturer's packaging in conformance with manufacturer's written instructions until ready for installation.

1.9 PROJECT CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.10 WARRANTY

A. Provide 5-year manufacturer warranty for occupancy sensors.

PART 2 - PRODUCTS

2.1 LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, and the like as required for a complete operating system.

C. Products for Switching of Electronic Ballasts and Drivers: Tested and rated to be suitable for peak inrush currents specified in NEMA 410.

2.2 OCCUPANCY SENSORS

A. Manufacturers:

1. Acuity Brands Lighting, Inc.

2. WattStopper

3. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

B. Occupancy Sensors:

1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, conforming to published coverage areas, for automatic control of load indicated.

2. Sensor Technology:

a. Passive Infrared (PIR) Occupancy Sensors: Designed to detect occupancy by sensing movement of thermal energy between zones.

b. Ultrasonic Occupancy Sensors: Designed to detect occupancy by sensing frequency shifts in emitted and reflected inaudible sound waves.

c. Passive Infrared/Ultrasonic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and ultrasonic technologies.

d. Passive Infrared/Acoustic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and audible sound sensing technologies.

3. Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.

4. Operation: Unless otherwise indicated, occupancy sensor to turn load on when occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.

5. Dual Technology Occupancy Sensors: Field configurable turn-on and hold-on activation with settings for activation by either or both sensing technologies.

6. Passive Infrared Lens Field of View: Field customizable by addition of factory masking material, adjustment of integral blinders, or similar means to block motion detection in selected areas.

7. Turn-Off Delay: Field adjustable, with time delay settings up to 30 minutes.

8. Sensitivity: Field adjustable.

9. Adaptive Technology: Field selectable; capable of self-adjusting sensitivity and time delay conforming to conditions.

10. Load Rating for Line Voltage Occupancy Sensors: As required to control the load indicated on drawings.

11. Isolated Relay for Low Voltage Occupancy Sensors: SPDT dry contacts, ratings as required for interface with system indicated.

12. Where wired sensors are indicated, wireless sensors are acceptable provided that components and wiring modifications necessary for proper operation are included.

13. Wireless Sensors:

    a. RF Range: 30 feet through typical construction materials.

    b. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with Federal Communications Commission (FCC) requirements of 47 CFR 15, for Class B application.

    c. Power: Battery-operated with minimum 10-year battery life.

C. Wall Switch Occupancy Sensors:

1. Wall Switch Occupancy Sensors:

    a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.

    b. Unless otherwise indicated or required to control the load indicated on drawings, provide line voltage units with self-contained relay.

    c. Where indicated, provide 2 circuit units for control of 2 separate lighting loads, with separate manual controls and separately programmable operation for each load.

    d. Operation: Field selectable to operate either as occupancy sensor (automatic on/off) or as vacancy sensor (manual-on/automatic off).

    e. Manual-Off Override Control: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.

    f. Provide selectable audible alert to notify occupant of impending load turn-off.

    g. Finish: Match finishes specified for wiring devices in WIRING DEVICES Section, unless otherwise indicated.

    h. Finish: Color to be selected.

    i. Provide vandal resistant lenses for passive infrared (PIR) and dual technology wall switch occupancy sensors where indicated.

D. General Requirements:

1. Ceiling Mounted Occupancy Sensors:

a. Description: Low profile occupancy sensors designed for ceiling installation.

b. Unless otherwise indicated or required to control the load indicated on drawings, provide low voltage units, for use with separate compatible accessory power packs.

c. Provide field selectable setting for disabling LED motion detector visual indicator.

d. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.

e. Finish: White unless otherwise indicated.

E. Directional Occupancy Sensors:

1. Directional Occupancy Sensors: Designed for wall or ceiling mounting, with integral swivel for field adjustment of motion detection coverage.

a. Unless otherwise indicated or required to control the load indicated on drawings, provide low voltage units, for use with separate compatible accessory power packs.

b. Provide field selectable setting for disabling LED motion detector visual indicator.

c. Finish: White unless otherwise indicated.

2. Passive Infrared (PIR) Directional Occupancy Sensors:

a. Standard Range Sensors: Capable of detecting motion within a distance of 40 feet at a mounting height of 10 feet.

b. Long Range Sensors: Capable of detecting motion within a distance of 80 feet at a mounting height of 10 feet.

c. High Bay Sensors: Capable of detecting motion within a distance of 50 feet at a mounting height of 30 feet.

F. Luminaire Mounted Occupancy Sensors: Designed for direct luminaire installation and control, suitable for use with specified luminaires.

G. Power Packs for Low Voltage Occupancy Sensors:

1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.

2. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.

3. Input Supply Voltage: Dual rated for 120/277 Volts AC.

4. Load Rating: As required to control the load indicated on drawings.

H. Occupancy Sensors:

1. Description: Plenum rated, self-contained relay compatible with specified wireless occupancy sensors for switching of line voltage loads.

2. Input Supply Voltage: Dual rated for 120/277 Volts AC.

3. Load Rating: As required to control the load indicated on drawings.

4. Load Rating:

a. General Purpose Load: Not less than 16 A.

b. Motor Load: Not less than 1/2 HP (120V) and 1.5 HP (277V).

5. Provide auxiliary contact closure output where indicated.

6. Rated Life of Relay: One million cycles.

7. Provide heavy duty coated steel wire protective guards compatible with specified occupancy sensors where indicated.

8. Description: Factory-assembled solid state programmable controller with LCD display, listed and labeled as complying with UL 916 or UL 917.

9. Program Capability:

a. 24-Hour Time Switches: Single channel, with same schedule for each day of the week and skip-a-day feature to omit selected days.

b. 7-Day Time Switches: Single channel, capable of different schedule for each day of the week with additional holiday schedule available to override normal schedule for selected days.

c. Astronomic Time Switches: Single channel, capable of different schedule for each day of the week with additional holiday schedule available to override normal schedule for selected days and f

d. Time Switches

10. Schedule Capacity: Not less than 16 programmable on/off operations.

11. Provide automatic daylight savings time and leap year compensation.

12. Provide power outage backup to retain programming and maintain clock.

13. Manual override: Capable of overriding current schedule both permanently and temporarily until next scheduled event.

14. Provide remote photocell input with light level adjustment.

15. Input Supply Voltage: As indicated on Drawings.

16. Output Switch Configuration: As required to control the load indicated on drawings.

17. Output Switch Configuration: SPST dry unpowered maintained contacts.

18. Output Switch Contact Ratings: As required to control the load indicated on drawings.

19. Output Switch Contact Ratings:

    a. Resistive Load: Not less than 30 A at 120-277 Volts AC.

    b. Tungsten Load: Not less than 5 A at 120 Volts AC.

    c. Inductive Load: Not less than 30 A at 120-277 Volts AC.

    d. Ballast Load: Not less than 20 A at 120 Volts AC or 6 A at 277 Volts AC.

    e. Motor Load: Not less than 1 HP at 120 Volts AC or 2 HP at 240 Volts AC.

20. Provide lockable enclosure; environmental type in conformance withNEMA EN 10250 as specified for the following installation locations:

    a. Indoor clean, dry locations: Type 1.

    b. Outdoor locations: Type 3R.

21. Provide flush-mounted unit where indicated, where mounted in public areas, or where mounted adjacent to flush-mounted equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and are properly sized to accommodate devices and conductors in conformance with NFPA 70.

C. Verify that openings for outlet boxes are neatly cut and shall be completely covered by devices or wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.

F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.

G. Verify that conditions are satisfactory for installation prior to starting Work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface, where required.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Install lighting control devices in conformance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes as required for installation of lighting control devices provided under this section.

1. Mounting Heights: Unless otherwise indicated, as follows:

a. In-Wall Time Switches: 48 inches above finished floor.

C. Install lighting control devices in conformance with manufacturer's written instructions.

D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

E. Install lighting control devices plumb and level, and held securely in place.

F. Where required and not furnished with lighting control device, provide cover plate in conforming with WIRING DEVICES Section.

G. Provide required supports in conformance with HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS Section.

H. Where applicable, install lighting control devices and associated cover plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on cover plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized cover plates in lieu of meeting this requirement.

I. Identify lighting control devices in conformance with IDENTIFICATION FOR ELECTRICAL SYSTEMS Section.

J. Occupancy Sensor Locations:

1. Location Adjustments: Do not make adjustments to locations without obtaining approval from Engineer.

2. Location Adjustments: Within the design intent, reasonably minor adjustments to locations may be made in order to optimize coverage and avoid conflicts or problems affecting coverage.

3. Location Adjustments: Locations indicated are diagrammatic and only intended to indicate which rooms or areas require devices. Provide quantity and locations as required for complete coverage of respective room or area based on manufacturer's written instructions for installed devices.

4. Locate ultrasonic and dual technology passive infrared/ultrasonic occupancy sensors a minimum of 4 feet from air supply ducts or other sources of heavy air flow and as per manufacturer's written instructions, in order to minimize false triggers.

K. Unless otherwise indicated, install power packs for lighting control devices above accessible ceiling or above access panel in inaccessible ceiling near the sensor location.

L. Where indicated, install separate compatible wall switches for manual control interface with lighting control devices or associated power packs.

M. Unless otherwise indicated, install switches on load side of power packs so that switch does not turn off power pack.

3.4 FIELD QUALITY CONTROL

A. Inspect each lighting control device for damage and defects.

B. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.

C. Test time switches to verify proper operation.

D. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Engineer.

C. Where indicated or as directed by Engineer, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology occupancy sensor lenses to block undesired motion detection.

D. Adjust time switch settings to achieve desired operation schedule as indicated or as directed by Engineer. Record settings in written report to be included with submittals.

3.6 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

## 3.7 CLOSEOUT ACTIVITIES

A. Demonstration: Demonstrate proper operation of lighting control devices to Engineer, and correct deficiencies or make adjustments as directed.

B. Training: Train Department's personnel on operation, adjustment, programming, and maintenance of lighting control devices.

1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

2. Provide minimum of 2 hours of training.

3. Instructor: Qualified contractor familiar with Project and with sufficient knowledge of the installed lighting control devices.

4. Location: At Project Site.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Dry-type transformers

B. Transformer pad Work shall be in conformance City of Los Angeles Department of Water and Power (LADWP) Transformer Pad General Requirements for Contractors available at: https://apps.engineering.lacity.gov/sites/g/files/wph726/f/2018%20LADWP%20CSCS%20C721-01%20Transformer%20Pad%20Requirements.pdf.

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 05 41 - Rigid Galvanized Steel Conduit

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 SUBMITTALS

A. Submit shop drawings, catalog cuts, outline drawings, and other working plans of the equipment and installation to Engineer for approval prior to purchase of materials.

B. Submit certified test reports for each unit.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Transformers:

1. Manufacturer: Square D by Schneider Electric.

2. Transformers shall have the following:

a. Dry type transformer vented.

b. Ratings and voltage as shown on Drawings.

c. Copper windings.

d. For outdoor applications, the enclosure shall be National Electrical Manufacturers Association (NEMA) Type 3R, heavy sheet steel, and finished with American National Standards Institute (ANSI) 61 gray enamel.

e. For indoor applications, the enclosure shall be NEMA 1.

f. Insulation shall be 30 kV basic insulation level (BIL) rated.

g. Impedance shall be 5 1/2 percent with a plus or minus over or under 7 1/2 percent.

h. Maximum temperature rise of 115 degrees C above 40 degrees C ambient, which provides 15 percent additional kilovolt ampere (kVA) capacity.

i. Transformer shall be approved for use by City of Los Angeles Testing Laboratory or meet requirements of a recognized testing laboratory approved by City of Los Angeles Department of Building and Safety.

j. Sound levels shall not exceed 64 decibels (dB) for 750 kVA to 1000 kVA, 65 dB for 1500 kVA, and 66 dB for 2000 kVA.

k. Mechanically brace core-coil assembly to withstand testing.

l. Coil construction and bracing shall be such as to prevent mechanical breakdown of insulation during short circuit.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Install transformers in conformance with manufacturer's written instructions and Drawings.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Low-voltage switchboard

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 05 26 - Grounding and Bonding for Electrical Systems

C. Section 26 05 41 - Rigid Galvanized Steel Conduit

D. Section 26 05 53 - Identification for Electrical Systems

E. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ISO 9000 - Quality Management Systems -- Fundamentals and Vocabulary.

1.5 SUBMITTALS

A. Provide 2 hard copies in 3-ring binders and 5 external flash drives with drawings in both PDF and AutoCAD DWG formats of the equipment and installation to Engineer. The operation and maintenance manual shall include but not be limited to the equipment furnished including protective relays, power fuses, and auxiliary relays and shall include characteristic curves for each different current transformer, protective relay, and power fuse where applicable. Include curcuit breaker recommended spare parts list.

B. Submit to Engineer for review test data supporting the integrated equipment short-circuit rating given to each switchboard by manufacturer. Submit certified test reports with the equipment delivery.

C. Submit to Engineer for review switchboard dimensional outline Drawings, front view elevation, floor plan, top view, single line, schematic diagram, wiring diagrams, bill of materials used in the switchboard, and necessary information for connection of conduits, buses, and completion of purchaser's engineering and installation requirements prior to manufacture.

D. Two copies of manufacturer's parts list, operations manual, and maintenance manual.

E. Submit shop drawing for concrete pad in conformance with CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

1.6 QUALITY ASSURANCE

A. Manufacturer shall be ISO 9000 certified to demonstrate quality compliance. Submit certificate of compliance.

B. Manufacturer of the assembly shall be the same manufacturer of the circuit breakers, trip units, and major electronic components within the assembly.

PART 2 - PRODUCTS

2.1 EQUIPMENT - GENERAL

A. Each switchboard, as a complete unit, shall be given a single integrated equipment rating by the manufacturer.

B. The integrated equipment short-circuit rating shall certify that the switchboard is capable of withstanding the stresses of a fault equal to that of the least over-current protective device contained therein.

C. Such rating shall be established by actual tests by the manufacturer on similar equipment constructed as the subject switchboard.

D. This test data shall be available and shall be furnished to Engineer, with or before the submittal of Drawings, for review.

E. Equipment shall be Underwriters Laboratories, Incorporated (UL) Listed and with UL labels.

2.2 MATERIALS

A. Equipment shall be 3-phase, 4-wire, with ampere and voltage ratings as shown on Drawings.

B. Weatherproof equipment shall be National Electrical Manufacturers Association (NEMA) Class 3R for outdoor installation.

C. Equipment shall be Square D Power-Style Multi-section switchboards with “I-Line” Group mounted devices, and “QED-2” distribution switchboards as shown on Drawings.

D. Switchboard, circuit breakers, and other equipment to which field installed wiring shall be connected shall be furnished with compatible connectors for copper conductors.

E. Equipment, buses, wiring, and accessories shall be accessible and removable from the front of the switchboard.

F. Control units shall be independent units, mounted independently of cover plates, and shall be removable without disturbing adjacent equipment.

G. Each switchboard section shall have an open bottom and individual removable top plate for installation and termination of conduit. Top and bottom conduit area shall be clearly shown and dimensioned on the approved shop drawings.

H. Wireway front covers shall be hinged to permit access to the branch breaker load side terminals without removing the covers.

I. Front plates used for mounting meters, selector switches, or other front-mounted devices shall be hinged, with wiring installed and laced with flexibility at the hinged side. Closure plates shall be screw-removable and small enough for easy handling by 1 person.

J. The exterior enclosure shall be so designed that weather tightness shall be assured with a minimum of gasketing.

K. Fastenings and fittings shall be of ample size and of corrosion-resistant materials, preferably series 304 or 316 stainless steel or hot-dip galvanized. Cadmium plating and electro-deposited zinc are not considered "corrosion-resistant" in the marine atmosphere in which the equipment is to serve, and are not acceptable.

L. The switchboard exterior shall be finished with American National Standards Institute (ANSI) 61 and with a rust inhibiting phosphatized coating.

M. Busing and bus taps shall be rectangular copper bar of 98 percent conductivity.

N. Joints, splices, and connections to buses shall have contact surfaces silverplated. Design contact surfaces on the basis of a maximum current density of 200 amperes per square inch of contact area.

O. Concrete for concrete pad shall be in conformance with CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

P. Each section of the switchboard shall be provided with a space heater thermostatically controlled. Power for the space heaters shall be obtained from a control power transformer within the switchboard. Supply voltage shall be 120 volts alternating current (AC).

Q. Control power transformers with primary and secondary protection shall be provided as required for proper operation of the equipment.

R. Provide N-Tron 714FX6-ST Ethernet Switch, Red Lion NTPS-24-1.3 24VDC power supply, and Corning SPH-01P single panel housing with 12 threaded ST connections for fiber optic cables.

S. Provide CAT6 communications cables (quantities and lengths as required) with RJ-45 terminations on each end, from Micrologic 6.0P Breaker Trip Units, Enerlin'X IFE Interface Units, AccuSine PCS+, and PowerLogic meters to the N-Tron Ethernet Switch. Provide 12-strand, 8.25 micron, single-mode, Corning fiber optic cables from central server rack patch panel to each Corning patch panel and provide patch cables (quantities and lengths as required) from patch panels to N-Tron Ethernet Switches. Terminate cables with ST terminations.

T. Provide Schneider Electric PowerLogic AccuSine PCS+ Model PCSP200D5IP54 active harmonic filters in freestanding NEMA 3R (IP54) enclosures (size, location, and quantities as shown on Drawings). AssuSine PCS+ is a 3-wire active harmonic filter capable of harmonics correction of line-to-line connected loads. AccuSine PCS+ shall have color HMI display, 1 USB front access, and 1 Modbus TCP 10/100BaseT communications ports. AssuSine PCS+ shall be rated 480VAC, 200A RMS output current, 200kA interrupt capacity, and 166kVAR reactive power.

U. Provide Energy Reduction Maintenance (ERMS) on switchboard main circuit breaker, as shown on Drawings. ERMS consists of a digital control module, 22 mm black 2-position rotary switch, clear plastic cover, and "ERMS" engraved nameplate. ERMS control module shall be installed on Micrologic X main curcuit breaker trip module, and when engaged, Micrologic X trip unit's Long Time, Short Time, Instantaneous, and Ground (LSIG) settings are replace (lowered) with ERMS LSIG custom settings. When ERMS switch is disengaged, the trip unit's LSIG settings are replaced.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Switchboard framework shall be on a prefabricated steel base or base assembly consisting of formed steel and commercial channel welded or bolted together to rigidly support the entire shipping unit for moving on rollers and floor mounting.

B. Framework shall be formed cold gage steel, rigidly welded and bolted together to support cover plates, busing, and component devices during shipment and installation.

3.2 CIRCUIT BREAKERS

A. Install circuit breakers so that each pole shall have a thermal and a magnetic trip unless otherwise specified.

B. Make provisions for locking each switch or circuit breaker in the “On” or "Off" position.

C. Equip each switchboard with 1 individually-mounted main breaker; draw-out type where indicated on Drawings.

3.3 BUSING

A. Busing shall be of such size as to carry full rated capacity for its entire length with a current density of not more than 1,000 amperes per square inch of cross section.

B. Bus taps shall be sized to carry the maximum current rating of the circuit breaker of switch frames to which they connect, regardless of the tripping calibration or the rating of trip elements or fuses initially installed.

C. Locate the main horizontal bus bars between sections on the back of the switchboard to permit a maximum of available conduit area.

D. The end section shall have bus bar provisions for future addition of a switchboard section. Provisions shall include the bus bars installed to the extreme side of the switchboard and pre-punched to facilitate future bolted splice plates.

E. The horizontal main bus bar supports, connections, and joints shall be bolted with Grade 5 carriage bolts and Belleville washers.

F. Provide bus taps, front plates, and mounting details complete and ready for mounting future circuit breakers and equipment specified or shown on Drawings.

3.4 GROUND FAULT

A. Provide ground fault protection on main breakers with adjustable pick-up from 20 percent of trip rating to 100 percent of trip rating, but not exceeding 1,200 ampere; ground fault time delay shall be adjustable 0.1 to 0.5 seconds. Provide neutral ground fault current transformer, where required. Supply integral ground trip on static trip breakers.

3.5 TRIP INDICATORS

A. Provide ground overcurrent resettable trip indicators for main breakers through 3,000 ampere frames, equipped with ground fault relaying.

3.6 INSTRUMENTATION

A. Provide current transformers (CT), voltage transformers (VT), shorting blocks, fuses, and fuse holders for Electric Power Monitoring (EPM) devices. Provide test blocks, for portable recording ammeter, and voltmeter. Include 4-20 mA transducers for remote indication of 3 phase amperes, 3 phase watts and single phase volts. Furnish the following microprocessor type metering device: Square D PowerLogic Power Meter Type PM-8244 with remote display.

B. Power Company Metering: Provide bused metering compartments in conformance with the applicable utility electrical service requirements.

3.7 GROUNDING

A. Ground switchboard enclosures in conformance with GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS Section.

3.8 CONCRETE PAD

A. Place concrete in conformance with CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

B. Construct a 9 inch thick concrete pad with double layer No. 4 steel reinforcing at 12 inches each way. Locate reinforcing steel 3 inches clear on each side. The top surface of the slab shall be 3 inches above the finished surface or construct concrete pad as shown on Drawings.

3.9 FIELD INSTALLATION

A. Install equipment in accordance with Drawings and manufacturer's written instructions.

B. Switchboard shall be securely bolted to concrete floor. Shipping sections shall be electrically connected with connectors furnished with the gear.

3.10 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Perform field tests recommended by the manufacturer and required by City of Los Angeles Electrical Code, in the presence of Engineer.

3.11 CHECK-OUT AND TESTING

A. Provide breaker and fuse coordination curve showing coordination between upstream and downstream overcurrent protective devices. Arrange for manufacturer's service representative to perform test and set breaker and relay trip devices. Submit written report to Engineer.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Panelboards:

1. Branch circuit

2. Distribution

B. Circuit breakers

1.2 RELATED SECTIONS

A. Section 09 90 01 - Painting for Exterior Improvements

B. Section 26 00 01 - Basic Electrical Materials and Methods

C. Section 26 05 21 - 600 Volt or Less Rated Wiring System

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 SUBMITTALS

A. In addition to the requirements of BASIC ELECTRICAL MATERIALS AND METHODS Section, submit descriptive data for products and materials, breaker layouts drawing with dimensions, component list, short circuit rating, voltage, and continuous current.

1.5 OPERATION AND MAINTENANCE MANUAL

A. Provide 2 hard copies in 3-ring binders and 5 external hard drives with drawings in both PDF and AutoCAD DWG formats of the equipment and installation to Engineer. The operation and maintenance manual shall include but not be limited to the equipment furnished including protective relays, power fuses, and auxiliary relays and shall include characteristic curves for each different current transformer, protective relay, and power fuse where applicable. Include circuit breaker recommended spare parts list.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Square D by Schneider Electric.

2.2 DISTRIBUTION PANELBOARDS

A. Dead front, dead rear, equipped with automatic circuit breakers for each circuit and paneled for accessibility. Provide minimum 8 inch gutter space at top and bottom of panelboard. Provide circuit breaker with individual engraved laminated plastic nameplate stating trip value and load supplied, screwed to interior trim. Include breaker frame size and type on nameplate if not readily identifiable without removing trim. Breakers shall be of the size and arrangement as shown on Drawings. Panels shall be fully bused, drilled, and tapped; copper busing. Voltages and ratings shall be as shown on Drawings. Provide lock-offs for each breaker.

2.3 BRANCH CIRCUIT PANELBOARDS

A. Interior: Shall consist of automatic circuit breakers (one for each branch circuit) properly secured and mounted in a dead front, dead rear code gage, galvanized steel cabinet with wiring gutter of sufficient width to provide ample space for branch circuit wires and feeders; in no case less than 4 inches wide. Provide barriered wireway for feedthrough panels. Provide minimum 8 inches gutter space at top and bottom of panelboard. Panels shall be fully bused; copper busing. Furnish each panel with 42-20 ampere 1-pole circuit breakers unless shown otherwise on Drawings or panel schedules.

B. Exterior: Shall consist of trim with hidden mounting screws for flush mounted panelboards, and door constructed of code gage sheet steel with factory finish. Door shall be fitted with hidden hinges and spring catch latch with cylinder lock. Provide directory cardholder on inside of door. Mounting screws shall allow adjustable alignment of trim and interior panel.

## 2.4 CIRCUIT BREAKERS

A. Circuit breakers shall be automatic trip-free, quick-make, quick-break, thermal-magnetic type; with handles clearly indicating tripped position. Multi-pole breakers shall have common trip and single handle. Breaker sizes, trip ratings, and arrangement in panelboards shall be in conformance with panel schedules. Breaker sizes shall be clearly stamped on handles or on laminated plastic nameplate attached to trim. Spaces for future breakers shall have bus drilled and tapped. Multi-pole breakers shall not be used for lighting or 120 volt receptacle circuits except where specifically required by City of Los Angeles Electrical Code. Provide lock-off or lock-on devices, where required.

B. Breakers for Distribution Panels: Square D Type I-Line; minimum interrupting rating 18,000 ampere, symmetrical at 480 volt. Provide high-interrupting rated breakers where noted or required. Breakers shall be plug-on to busing.

C. Breakers for 480Y/277 Volt Lighting Panelboards: Square D Type NF; minimum interrupting rating 18,000 ampere symmetrical at 277 volt, bolted to busing. Provide lock-off device for each breaker.

D. Breakers for 208Y/120 volt or 120/240 volt Receptacle Panelboards: Square D Type NQ; minimum interrupting rating 10,000 ampere, symmetrical at 240 volt, bolted to busing. Panelboards shall have amps interrupting capacity (AIC) rating as specified on Drawings. Provide sub-feed breakers where indicated on schedules.

## 2.5 IDENTIFICATION

A. Nameplates: Provide identification nameplates on panelboards. Nameplates shall be engraved black Lamicoid with minimum 1/4 inch high white letters. Nameplate shall state panel designation, voltage and bus ampere rating, and shall be riveted or screwed to panelboard housing. Provide engraved branch circuit breaker numbering strip, screwed or riveted, on panelboard internal trim.

B. Schedules: Provide load schedules for branch circuit panelboards identifying type, size, and location of load. Schedules shall be typewritten and protected by transparent plastic cover.

PART 3 - EXECUTION

3.1 INSTALLATION

A. In general, support panels on building structure. Provide auxiliary supports where required. Auxiliary supports shall be Unistrut.

B. Mount panels so that the tops of trims are at 6’-6” above finished floor, unless noted otherwise on Drawings.

C. Install panelboards as indicated on Drawings and in conformance with the manufacturer’s written instructions.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Electricity meter

B. Electrical services shall be in conformance with City of Los Angeles Department of Water and Power (LADWP) Electrical Service Requirements for Contractors available at: https://apps.engineering.lacity.gov/techdocs/abh/2018ElectricServiceRequirementsManual.pdf.

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 24 16 - Panelboards

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of the Bid Proposal Line Items.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The meter safety socket box shall be in conformance with City of Los Angeles Department of Water and Power (LADWP) requirements and as called for on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install meter in conformance with LADWP standards and requirements.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wiring devices

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. NEMA WD 1 - General Color Requirements for Wiring Devices.

B. NEMA WD 6 - Wiring Devices - Dimensional Specifications.

C. NFPA 70 - National Electrical Code.

1.5 SUBMITTALS

A. Product Data: Manufacturer's catalog information showing dimensions, colors, and configurations.

B. Manufacturer's installation instructions.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section shall have minimum 5 years documented experience.

B. Conform to requirements of NFPA 70.

C. Products shall be listed and classified by Underwriters Laboratories, Inc. (UL), or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.7 EXTRA MATERIALS

A. Furnish 2 of each style, size, and finish wall plate.

B. Provide 2 protective rings.

C. Provide 2 carpet rings.

PART 2 - PRODUCTS

2.1 WALL SWITCHES

A. Manufacturers:

1. HubbelL

2. Pass & Seymour

B. Description: Conforming to NEMA WD 1, heavy-duty, AC only general-use snap switch.

C. Body and Handle: White plastic with toggle handle.

D. Indicator Light: Lighted handle type switch; red color handle.

E. Locator Light: Lighted handle type switch; green color handle.

F. Ratings:

1. Voltage: 120-277 volts, AC.

2. Current: 20 amperes or match branch circuit and load characteristics.

2.2 WALL DIMMERS

A. Manufacturers:

1. Watt-Stopper

2. Lutron

B. Description: Conforming to NEMA WD 1, Type II semiconductor dimmer for incandescent lamps.

C. Body and Handle: White plastic with linear slide.

D. Voltage: 120 volts.

E. Power Rating: Match load shown on Drawings; 1000 watts minimum.

F. Power Rating: As indicated in schedule shown on Drawings.

G. Accessory Wall Switch: Match dimmer appearance.

2.3 RECEPTACLES

A. Manufacturers:

1. Hubbell.

2. Pass & Seymour.

B. Description: Conforming to NEMA WD 1, Heavy duty general use receptacle.

C. Device Body: White plastic.

D. Configuration: Conforming to NEMA WD 6, type as specified and indicated.

E. Convenience Receptacle: Type 5-20.

F. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

G. Isolated Ground Receptacle: Type.

H. Transient Voltage Surge Suppression (TVSS) Receptacle

2.4 WALL PLATES

A. Decorative Cover Plate: Smooth stainless steel.

B. Jumbo Cover Plate: Smooth stainless steel.

C. Weatherproof Cover Plate: Gasketed cast metal with hinged gasketed device cover.

2.5 FLOOR MOUNTED SERVICE FITTINGS

A. Pedestal Convenience Receptacle:

1. Housing: Satin aluminum.

2. Device Plate: Stainless steel.

3. Configuration: One duplex.

B. Flush Cover Convenience Receptacle:

1. Material: Brass.

2. Configuration: Duplex flap opening.

C. Flush Cover Communication Outlet:

1. Material: Brass.

2. Configuration: 2-1/8 by 1-inch combination threaded opening.

D. Pedestal Combination Fitting:

1. Housing: Satin aluminum.

2. Device Plate: Stainless steel.

3. Configuration: One duplex convenience receptacle with one bushed opening, 1 inch inside diameter.

E. Flush Cover Combination Fitting:

1. Material: Brass.

2. Configuration: Duplex flap opening with 2-1/8 by 1-inch combination threaded opening.

F. Protective Ring: Brass finish.

G. Split Nozzle: Brass finish.

H. Carpet Ring: Brass.

2.6 POKE-THROUGH FITTINGS

A. Manufacturers:

1. Hubbell. Website: https://www.hubbell.com/hubbell/en.

2. Leviton. Website: https://leviton.com/.

B. Description: Assembly comprising service fitting, poke-through component, fire stops and smoke barriers, and junction box for conduit termination.

C. Fire Rating: 3 hours.

D. Service Fitting:

1. Type: Pedestal.

2. Housing: Satin aluminum.

3. Device Plate: Stainless steel, brown plastic.

4. Configuration: One duplex and one communications outlet.

2.7 ACCESS FLOOR BOX

A. Manufacturers:

1. Hubbell.

2. Leviton

B. Description: Sheet metal box suitable for mounting in access floor system.

C. Size: In conformance with CEC requirements.

D. D. Cover: Impact resistant plastic finish as selected by Engineer.

E. Convenience Receptacle: Two with isolated ground.

F. Communications Receptacle: Two modular jacks.

G. Data Receptacle: One.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions prior to beginning work.

B. Verify that outlet boxes are installed at proper height.

C. Verify that wall openings are neatly cut and shall be completely covered by wall plates.

D. Verify that floor boxes are adjusted properly.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

F. Verify that openings in access floor are in proper locations.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean debris from outlet boxes.

3.3 INSTALLATION

A. Install in conformance with NECA Standard of Installation.

B. Install devices plumb and level.

C. Install switches with OFF position down.

D. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.

E. Do not share neutral conductor on load side of dimmers.

F. Install receptacles with grounding pole on top.

G. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

H. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

I. Connect wiring devices by wrapping conductor around screw terminal.

J. Use jumbo size plates for outlets installed in masonry walls.

K. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

L. Install protective rings on active flush cover service fittings.

3.4 MOUNTING HEIGHTS

A. Coordinate locations of outlet boxes provided to obtain mounting heights specified and indicated on Drawings.

B. Install wall switch 48 inches above finished floor.

C. Install convenience receptacle 18 inches above finished floor.

D. Install convenience receptacle 6 inches above counter or backsplash of counter.

E. Install dimmer 48 inches above finished floor.

F. Install telephone jack 18 inches above finished floor.

G. Install telephone jack for side-reach wall telephone to position top of telephone at 48 inches above finished floor.

H. Install telephone jack for forward-reach wall telephone to position top of telephone at 48 inches above finished floor.

I. Coordinate installation of access floor boxes with access floor system.

3.5 FIELD QUALITY CONTROL

A. Quality Control and Starting of Systems: Field inspection, testing, adjusting, and balancing.

B. Inspect each wiring device for defects.

C. Operate each wall switch with circuit energized and verify proper operation.

D. Verify that each receptacle device is energized.

E. Test each receptacle device for proper polarity.

F. Test each GFCI receptacle device for proper operation.

G. Verify that each telephone jack is properly connected and circuit is operational.

3.6 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.7 CLEANING

A. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Surge protective devices as indicated on Drawings and as specified including but not limited to the following:

1. Service entrance surge suppressors
2. Panel suppressors
3. Electrical equipment and raceway grounding and bonding.

## 1.2 RELATED SECTIONS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be included in the Electrical System bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. IEEE C62.33 - Test Methods and Performance Values for Metal-Oxide Varistor Surge Protective Components.

B. IEEE C62.41.1 - IEEE Standard Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits.

C. UL 497A - Standard for Secondary Protectors for Communications Circuits.

D. UL 1283 - Standard for Electromagnetic Interference Filters.

E. UL 1449 - Standard for Surge Protective Devices.

## 1.5 SUBMITTALS

A. Product Data: Indicated surge protective device and connectors.

B. Shop Drawings: Indicate surge protective device and connectors.

C. Test Reports: Submit manufacturer’s UL certified test and nameplate data for each surge protective device(s).

1.6 QUALITY ASSURANCE

1. Underwriters Laboratories, Incorporated (UL) Compliance and Labeling:

   a. For power and signal circuits, surge protective device shall be in conformance with UL 1449 and UL 1283 as an electromagnetic interference filter. Provide units which shall be listed and labeled by UL.

   b. For telephone circuit protection, surge protective device shall be in conformance with UL 497A.

2. ANSI Compliance: Use surge protective device that comply with IEEE C62.41.1 and IEEE C62.33.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Surge protective devices shall be manufactured by Square D by Schneider Electric.

2.2 DESIGN REQUIREMENTS

A. Surge protective devices (SPD) or transient voltage surge suppressors (TVSS) for power circuits, provided under this Section, shall be the product of a single manufacturer and shall be of modular construction designed for field replacement.

B. SPD shall be capable of performance at ambient temperature between 40 and 60 degrees Celsius (C), at relative humidity ranging from 0 percent to 95 percent, and at altitudes ranging from sea level to 12,000 feet.

C. SPD shall be protected by a circuit breaker or fused to disconnect the suppressor from the electronic source should the processor fail. The fusing shall allow full surge handling capabilities and to afford safety protection from thermal overloads and short circuits.

D. Design SPD for the specific type and voltage of the electrical service. Single-phase and 3-phase wye-configured systems shall have L-N, L-G, and N-G protection.

E. Power filter: SPD shall include a high frequency extended range power filter and shall be UL 1283 listed as an electromagnetic interference filter.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Install surge protectors as close as practical to the electrical panel or dedicated electronic equipment to be protected. SPD shall be close connected to the panel in a position near the panel board neutral bus bar or positioned so that the overall lead length shall be minimal.

B. Install surge protectors in a manner consistent with proper and acceptable industry wiring practice. SPD connection leads shall be as short and straight as possible while avoiding sharp bends.

C. Provide surge protectors with terminals shall be wired with stranded conductor size permitted within rating of lugs. Minimum wire size shall be 10 AWG conductors.

D. Install surge protectors with a means for disconnecting the device for servicing via an integral fused or a dedicated three-pole 15 amp minimum circuit breaker.

E. Provide surge protective devices at locations and equipment indicated on Drawings and panel schedules.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Lighting fixtures

B. Lamps

C. Ballasts

D. Seismic restraints

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 SUBMITTALS

A. Submit to Engineer the following in hard copy and electronic file format:

1. Manufacturer’s catalog sheets of standard fixtures, indicating materials, dimensions, supports, standard finishes available, weights, and approval of fixtures from City of Los Angeles Department of Building and Safety or recognized testing laboratory approved by City of Los Angeles Building and Safety.

2. Pictures or cuts of lighting fixtures, with distribution curves, and complete photometric data.

3. Manufacturer’s catalog sheets indicating input and load electrical characteristics, ambient temperature rating, noise level rating, mounting methods, and UL listing for use with required lamps.

4. Samples: Submit 1 sample of each lighting fixture type (at the option of Engineer) for review at the time the materials list is submitted for approval.

5. Outdoor lighting analysis with the fixture material submittal showing the fixture manufacturer’s written instructions of fixture beam spread, manufacturer’s recommended aiming diagram, and a table showing calculated levels of illumination for the area.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fixtures shall be standard products of the fixture manufacturers, approved, and bear the label of Underwriters Laboratories, Incorporated (UL). Fixture types shall be as indicated on Drawings.

B. Diffusers: Plastic diffusers or lenses shall be 100 percent pure virgin acrylic, unless otherwise specified.

C. Complete units and electrical components of custom made fixtures shall be approved by City of Los Angeles Department of Building and Safety or meet requirements of recognized testing laboratory approved by City of Los Angeles Department of Building and Safety. Do not place labels on fixtures at locations where installation of unit labels is visible after installation.

D. Exposed metal parts of exterior lighting fixtures shall be stainless steel, anodized aluminum or have a mil zinc coating applied after fabrication and before finish. Screws and fastening shall be stainless steel. Painted finishes shall be as specified in schedules.

E. Ballasts for fluorescent fixtures shall be electronic rapid-start type capable of operating T8-32 watt rapid-start lamps at full light output with minimum input watts. Ballasts shall be Motorola (800) 654-0089 or GE. Fluorescent lamps other than 32 watt rapid start shall be operated by the most energy-efficient ballast available. Ballasts shall be Class P equipped with automatic resetting thermal protectors built in adjacent to the transformer coils. Ballasts shall be Electrical Testing Laboratory (ETL) tested and Certified Ballast Manufacturers (CBM) certified. Ballasts shall meet applicable American Standards Institute (ASI) and UL specifications regarding reliable starting, radio interference, dielectric, and sound ratings. Ballasts shall be high power factor; voltages shall be as specified in the fixture schedule. Provide a 3-year written warranty for materials and labor on ballasts. Provide ballasts as required for switching as indicated on Drawings. One-lamp fluorescent luminaire, pendant, or surface mounted within 1 foot of each other or recess mounted 10 feet of each other, shall be tandem wired to eliminate unnecessary use of single lamp ballasts, i.e., a 2-lamp ballast shall be mounted in one of the luminaires to serve the single odd lamp in each of the 2 luminaires.

F. Lamps:

1. Fluorescent lamps shall be rapid start type. Lamps shall be warm white, except as noted and shall have minimum rating of 3000 lumens. Lamps shall be Bi-Pin, T12, 430 m.a. Length of lamps as shown on drawings. Four foot lamps shall be low energy type, 35 watts as manufactured by General Electric or Sylvania.

2. Industrial type fluorescent fixtures shall have porcelain enamel finish.

2.2 MANUFACTURERS

A. As noted on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install fixtures level, plumb, and in line on outlets and connected to the wiring, ready for operation. Assemble fixtures with screw and nuts tight, and parts securely mounted. Provide additional parts, wire, screws, nuts, washers, locknuts, bushings, or required structural supports to make fixture installation complete, safe, and substantial. Parts, including paint and finish, shall be clean and undamaged.

B. Fixtures installed in gypsum board ceilings or plaster soffits shall be provided with metal frames. Fixtures in concrete shall have steel housing with bitumastic paint finish. Fixtures shall be compatible with type of ceiling.

C. Mount exterior fixtures requiring exposed exterior boxes on approved cast boxes equipped with suitable gaskets.

D. Do not install louvers, diffusers, or lenses in lighting fixtures until glazing has been completed and construction Work involving plastering, grinding, sanding, painting, and final clean-up sweeping and dusting have been completed.

E. Clean reflector surfaces and lamps in lighting fixtures prior to installation of louvers, diffusers, or lenses.

F. Installation of recessed fixtures shall include independent support wires of 9 gage steel wires to the supporting building structure at diagonal corners of each fixtures. Wire to have 6 inch slack.

G. Interior and exterior adjustable lighting fixtures shall be aimed, adjusted, and set to the satisfaction of and in the presence of Engineer.

H. Fixture Supports: Surface-mounted fluorescent fixtures shall have minimum of 2 supports per 4-foot fixture, 1 near each end, fastened directly to structural members. Method of installation shall be approved by Engineer. Fixtures shall be grounded by fastening to outlet box fixtures stud or conduit connection to fixture.

I. Stems for pendant fixtures shall have approved swivel hanger and canopy at the ceiling.

J. Recessed fixtures in suspended ceiling shall be free of light leaks above and below ceiling and shall have adequate ventilation.

1. Reflectors, cones, or baffles shall be absolutely free of spinning lines, ripples, or any marks or indentations caused by riveting or other assembly techniques. No rivets, springs, or other hardware shall be visible after installation.

2. Lamp sockets shall be rigidly and securely attached to the fixture enclosure or husk to insure safe operating temperature as recommended by lamp manufacturer.

K. At time of final observation, ballasts and lamps shall have been installed and in operating condition. Remove faulty lamps and replace with new lamps as approved by Engineer.

3.2 CLEANING

A. Clean lamps after installation.

## 3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Run a complete burn test for the light fixtures and lamps installed for a duration of 5 days continuously. Repeat test for early burn outs. If premature lamp failure occurs, replace the lamp at no additional cost to Department and retest the fixture. Notify Engineer 5 calendar days prior to start of burn test.

2. Engineer shall perform an intensity test. Contractor shall make any necessary adjustments within the capability of the fixture, at no expense to Department.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Interior lighting fixtures

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 SUBMITTALS

A. Submit to Engineer the following in hard copy and electronic file format:

1. Descriptive data for products and materials.

2. Shop drawings for the following:

a. Lighting fixtures.

b. Supports.

PART 2 - PRODUCTS

2.1 GENERAL

A. Labels: Fixtures shall be inspected, approved, and bear the label of Underwriters Laboratories, Incorporated (UL).

B. Diffusers: Plastic diffusers or lenses shall be 100 percent pure virgin acrylic, unless otherwise specified.

C. Ballasts for fluorescent fixtures shall be electronic rapid-start type capable of operating T8-32 watt rapid-start lamps at full light output with minimum input watts. Ballasts shall be Motorola (800) 654-0089 or GE. Fluorescent lamps other than 32 watt rapid start shall be operated by the most energy-efficient ballast available. Ballasts shall be Class P equipped with automatic resetting thermal protectors built in adjacent to the transformer coils. Ballasts shall be Electrical Testing Laboratory (ETL) tested and Certified Ballast Manufacturers (CBM) certified. Ballasts shall meet applicable American Standards Institute (ASI) and UL specifications regarding reliable starting, radio interference, dielectric, and sound ratings. Ballasts shall be high power factor; voltages shall be as specified in the fixture schedule. Provide a 3-year written warranty for materials and labor on ballasts. Provide ballasts as required for switching as indicated on Drawings. One-lamp fluorescent luminaries, pendant or surface mounted within 1 foot of each other or recess mounted 10 feet of each other, shall be tandem wired to eliminate unnecessary use of single lamp ballasts, i.e., a 2-lamp ballast shall be mounted in one of the luminaries to serve the single odd lamp in each of the 2 luminaries.

2.2 LAMPS

A. Fluorescent lamps shall be SP30, rapid-start, unless otherwise noted.

B. Incandescent lamps shall be inside-frosted, rated at 120 volts unless otherwise specified in the fixture schedule.

2.3 MANUFACTURERS

A. As noted on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fixtures per Drawings and manufacturer's written instructions.

B. General: Install fixtures level, plumb and in line on outlets and connected to the wiring, ready for operation. Fixtures shall be assembled with screw and nuts tight, and parts securely mounted, and necessary additional parts, wire, screws, nuts, washers, locknuts, bushings, or required structural supports shall be furnished and installed by Contractor to make fixture installation complete, safe and substantial. Parts, including paint and finish, shall be clean and undamaged.

C. Connections between branch circuit conductors and fixture conductors, and circuit connections for continuous row installation, shall be as specified under Wiring Methods. Internal fixture connections shall be manufacturer's standard and shall conform to City of Los Angeles Electrical Code requirements.

D. At time of final observation ballasts and lamps shall be installed and in operating condition. Faulty lamps shall be removed and replaced with new lamps.

3.2 SUPPORTS

A. Fixture Supports: Surface-mounted fluorescent fixtures shall have minimum of 2 supports per 4-foot fixture, 1 near each end, fastened directly to structural members; method of installation shall be approved. Fixtures shall be grounded by fastening to outlet box fixtures stud or conduit connection to fixture.

B. Stems for pendant fixtures shall have approved swivel hanger and canopy at the ceiling.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Contractor shall run a complete burn test for the light fixtures and lamps installed for a duration of 5 days continuously. Repeat test for early burn outs. If premature lamp failure occurs, replace the lamp at no cost to Department and retest the fixture. Notify Engineer 5 calendar days prior to start of burn test.

2. Engineer shall perform an intensity test. Contractor shall make any necessary adjustments within the capability of the fixture, at no expense to Department.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wooden poles

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Wooden Poles:

1. Wooden poles shall conform with dimension for Class 2, Douglas Fir 40 foot wooden utility poles embedded as shown on Drawings.

B. Wood Preservation Treatment:

1. Pole treatment preservation shall be one of the following:

| Treatment | Retentive pounds per cubic feet |
|---|---|
| | |
| Pentachlorophenol, Volatile Petroleum Solvent LPG (Koppers Cellon) | 0.50 |
| | |
| Pentachlorophenol Methylene Chloride WTG (Dowicide 7 Penta) | 0.50 |
| | |
| Ammoniacal Copper Arsenite (Chemonite, J. Baxter) | 0.50 |

2. Protect pole in transit and during installation.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Set pole as shown on Drawings.

B. Compact sand around pole to a minimum of 95 percent relative compaction.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Site lighting

1.2 RELATED SECTIONS

A. Section 32 13 14 - Concrete for Exterior Improvements

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be included in each corresponding Electrical System bid item of Bid Proposal Line Items that requires site lighting.

1.4 QUALITY ASSURANCE

A. Custom fixture manufacturers shall have a minimum 5 years of experience in the design and manufacturing of lighting fixtures of the type, quantity, and quality shown. Qualification submissions shall include a list of completed projects, dated catalog pages, or drawings indicating length of experience.

B. Manufacturer must own and operate the shop for fabrication of architectural luminaires and be regularly engaged in the fabrication and installation of such equipment. Fabrication and installation of such equipment shall comprise not less than 90 percent of the manufacturer's business.

C. Certifications: Contractor shall demonstrate in a written statement that they have performed similar Work on similar projects with regard to size and type of project within the past 10 years, if requested by Department. Performance shall be demonstrated on the selected projects for on time delivery, successful implementation of the design with regard to quality, appearance, and construction.

D. Contractor shall be responsible for coordinating with the other trades to ensure and maintain adequate recess clearance as lighting positions are critical and shall take precedence over other concealed building systems.

E. Contractor shall be responsible for installing fixtures with proper ventilation so as not to exceed the temperature rating of the lighting fixtures or lamps.

1.5 SUBMITTALS

A. Make submittals no later than 30 Calendar Days prior to start of Work of this Section.

B. No release of orders for lighting equipment shall be made until review of submittals is complete.

C. Product Data: Submit complete list of items proposed under this Section for approval by Engineer. Submit a list of fixture types, catalog number, and quantities and catalog cuts for all items. Clearly mark or underline proposed items in red; list sources of materials. Manufacturer's product data shall be marked clearly to indicate all technical information that indicates conformance to all specified requirements in Contract Documents. Include the following information with all product data:

1. Manufacturer's catalog sheets of standard fixtures, indicating materials, ballasts, lamp types, dimensions, standard finishes available, weights, and Underwriters Laboratories, Incorporated (UL) approval.

2. Structural engineering data related to the pole bases, poles, luminaire arms, and luminaire attachments. Such data shall be sufficient for the Engineer to review dimensions, materials, and attachment details for the submitted fixtures.

3. Complete ballast information on fluorescent and high-intensity (HID) fixtures.

4. Complete photo-control information including photosensor unit, receptacle, fuse, and fuse holder.

5. Complete list of lamps which shall be furnished on Project. This list shall be organized alphabetically by the luminaire type indicated on the luminaire schedule, and include the manufacturer and exact model number of each lamp. Up to 3 samples of any listed lamp shall be supplied at no additional cost to Department, if so requested by Engineer.

6. Should Contractor anticipate that the delivery schedule of specified product may adversely impact the construction schedule, it shall be brought to the attention of Engineer at this time. Request for fixture substitution on the basis of delivery schedule shall not be permitted.

D. Submit a certified vibration test from an independent testing laboratory approved by Engineer. Include the testing procedure and data for the luminaire and components as they would be used in the actual field installation with the luminaire attached to the bracket arm anchorage to the lighting or multi-function pole.

E. Submit test reports for photometrics from an independent testing laboratory approved by Engineer, calculated conforming to Illuminating Engineering Society of North America (IES) standards. Photometrics shall include the following:

1. For floodlighting and area lighting:

a. Iso-footcandle charts with all necessary conversion tables for varying heights and lamp types, coefficient of utilization information, and IES roadway distribution classification.

2. For directional luminaires used for spotlighting:

a. Candlepower distribution curve and table. Data in table shall have vertical angles no greater than 10 degrees increments, (5 degrees, 15 degrees, 25 degrees, and the like). Asymmetric distributions shall have quadrants represented in 22.5 degree increments, (parallel, 22.5 degrees, 45 degrees, normal), or sufficient increments to fully describe asymmetric light distribution.

b. Zonal lumens stated numerically in 10 degree increments, (5 degrees, 15 degrees, and the like) or smaller increments for narrow beam fixtures.

F. Qualification Statements: Submit statements required under Quality Assurance Article of this Section for manufacturers, fabricators, installers, applicators, inspectors, and welders.

G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in City's name and registered with manufacturer.

1.6 MOCK-UPS

A. Upon approval of the shop drawing submittals, provide mock-up for approval by Engineer of specified standard and custom fixture types. Provide lamp(s) and cord and 3-prong U-ground plug for 120V operation. The mock-up shall be retained by Department and if acceptable, shall be incorporated into Project.

B. Location of the mock-up shall be at Project Site. Mock-up shall include review of the fixture in an environment similar to the actual installed condition.

C. Provide manufacturer's instructions for proper storage, handling, protection, examination, preparation, and installation of product to Contractor prior to installation.

D. Provide corrected mock-ups until fixtures are approved by Engineer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance at Project Site:

1. Delivery of material shall be scheduled to reduce on-site storage time required.

2. Notify Engineer 7 Calendar Days prior to the time of delivery.

3. Contractor shall be responsible for acceptance of lighting equipment at Project Site, confirming that all quantities and counts are correct and for keeping accurate logs and records of such information. Logs and records shall include but not be limited to date of shipment, date of acceptance at Project Site, name and signature of individual accepting equipment at Project Site, location of storage area, and confirmation that quantity counts listed on bills of lading have been made. A copy of the shipping invoice or bill of lading shall be kept with each log entry of acceptance at Project Site. Logs and records shall be made available immediately upon request by Engineer.

B. Special Handling:

1. Deliver site lighting fixtures and specified component parts to Project Site in appropriate protective packaging, wrapped and sealed and substantially crated as furnished by manufacturer. Store products in unopened cartons in a protected location.

2. Packaging for each unit shall be clearly labeled, indicating the equipment contained, “front”, “top”, “fragile”, the project name, and Project Site allocation. Include packing and shipping lists for each container.

3. Handling and shipping shall be performed in conformance with manufacturer’s written instructions.

C. Storage and Protection: Store units at Project site to prevent exposure to weathering, vandalism or damage from Work of other trades. Damaged materials shall be rejected. Remove damaged materials from Project Site immediately, and replace at Contractor’s sole cost and expense.

1.8 OPERATIONS AND MAINTENANCE MANUALS

A. Operations and Maintenance Manuals:

1. Prepare and deliver to Engineer within 10 Calendar Days prior to completion of construction, 3 hard cover binders with 3 rings containing the following information:

a. Index sheet stating Contractor's address and telephone number, list of equipment with name, and addresses of local manufacturer's representatives.

b. Catalog and parts sheets on every material and equipment installed under Contract.

c. Warranty statements on equipment.

d. Complete operating and maintenance instruction on equipment furnished.

B. Turnover of Materials: Half of the lamps remaining after the final aiming shall be turned over to Engineer for stock; while the others shall be returned unopened to Contractor.

1.9 EXTRA MATERIALS

A. Provide the following material as spare parts for use by Department. The material shall be delivered to the location designated by Engineer for storage in conformance with Engineer’s instructions.

1. Provide 10 percent additional (attic stock) for each specified lamp type.

2. Provide 10 percent spares of each luminaire (“light fixture”), exclusing pole, on Project, with a minimum of 1 of each fixture type.

3. Provide 10 percent spares of each lighting fixture pole with base and anchor bolt assembly for each fixture type on Project, with a minimum of 1 lighting fixture pole with base and anchor bolt assembly for each fixture type.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Inground Lighting Manufacturer:

1. LED Linear USA, Inc., www.ledlinearusa.com

2.2 MATERIALS

A. Inground Lighting:

1. Inground lighting and system shall be VarioLED OCEANOS 316/L RGB HD10-1010 IP68.

B. Luminaires:

1. Provide proper thickness of code gage sheet steel so that luminaires are rigid, stable, and shall resist deflection, twisting and warping under normal installation procedures, re-lamping, and maintenance.

2. Luminaire designs shall include, as applicable, plaster frames, trim rings, shrouds, flanges, backboxes, support hardware, and other components required for proper installation of the luminaire.

3. Luminaires with covers, cones, or diffuser frames, which are to be mounted above 12 feet from the finished floor level, shall be provided with safety chains or other acceptable backup means of support to properly secure such items to main housing.

4. Fixtures shall be UL approved for their application and location and have the appropriate UL label adhered to the fixture visible within the housing of each fixture.

5. Rows of luminaires shall be designed with concealed splice plates and shall be free of light leaks. Components such as reflectors, trims, diffusers, and other visible items shall be properly aligned with no overlaps, gaps, or other imperfections.

6. Adjustable fixtures interior and exterior shall provide methods to lock fixture in place. This includes rotation and tilt adjusting.

7. Hardware shall be concealed where it is appropriate, unless it is a design feature.

8. Where hardware is exposed, hardware shall be painted to match adjacent surfaces unless otherwise noted on Drawings.

9. Materials, accessories, and other related fixture parts shall be new and free of defects, which may impair their character, appearance, strength, ability, or function. Fixtures shall be protected from damage from the time of fabrication until final acceptance of Work.

10. Contractor is responsible for coordination of special mounting conditions for custom fixtures and shall supply necessary mounting devices.

11. Fixtures shall be completely wired at the factory. Fixtures shall come with electrical wiring in conformance with UL, National Electrical Code, and any governing local codes

12. Provide neoprene gasketing, stops, and barriers where required to prevent light leak and/or water and water vapor penetrations. Luminaires installed in the following locations shall have neoprene gasketing:

    a. Marine Environments

    b. Exterior

13. Provide finished product with smooth clean ground metal edges, trims, and frames as well as tight fitting connections, hinges, and closures.

14. Provide access for servicing the installed luminaire and for replacement of electrical parts without removal or disassembly of the luminaire.

15. Unless otherwise noted on Drawings, provide emergency battery packs, emergency quartz re-strike, or stand-by systems as required for luminaires connected to emergency circuits.

16. Luminaire doors shall be provided as follows: Positive light seal, concealed safety hinges, and inconspicuous "positive spring loaded" holding latches, which are hingeable from either side and operable without the use of tools.

C. Incandescent and Halogen Luminaires:

1. Incandescent luminaires utilizing tungsten halogen sources shall be designed and constructed so that lamp seal temperatures do not exceed 350 degrees Celsius (C). at an ambient of 25 degrees C when tested in accordance with UL Standard number 57, and shall maintain an operating bulb wall temperature of approximately 600 degrees C and not less than 250 degrees C.

2. Lead wires for luminaires utilizing tungsten halogen lamps shall be rated for not less than 200 degrees C operation, and shall be rated for 250 degrees C when temperature warrants. Minimum individual fixture wiring shall be number 18 gage. Terminate wiring for recessed fixtures, except fluorescent units, in external splice box.

3. Temperature at any point on reflectors of tungsten halogen luminaires shall not exceed 205 degrees C.

4. Incandescent luminaires supplied for recessing in suspended ceiling shall be supplied with pre-wired junction boxes.

D. High-Intensity Discharge (HID) Luminaires:

1. High intensity discharge luminaires, connected to emergency circuits, shall be provided with a quartz re-strike or stand-by system which is activated during loss of power until the high intensity discharge lamp returns to full light intensity.

2. High intensity discharge luminaires shall be completely enclosed, unless otherwise noted on Drawings.

3. Where acrylic is used for lenses, refractors, and diffusers with luminaires with HID sources, the luminaires shall be designed not to exceed a 65 degrees C luminaire ambient temperature.

E. Custom Luminaires:

1. Custom fixture manufacturers shall supply working sample and complete shop drawings to design team for review. Sample fixtures shall become property of Department.

2. Fixtures shall be UL approved for their proposed location.

3. Exposed hardware shall be concealed where appropriate unless as a design feature.

4. Materials, accessories and other related fixture parts shall be new and free of any defects which in any manner may impair their character, appearance, strength or ability and function effectively protected from damage or injury from the time of fabrication until final acceptance of Work.

5. Sheet metal shall be free from tool marks and dents and shall have accurate angles as sharp as compatible with the gage of the required metal. Intersections and joints shall be formed true of adequate strength and structural rigidity to prevent distortion after assembly.

6. Housing shall be so constructed that electrical components are easily accessible and replaceable without removing fixtures from their mountings or disassembly of adjacent construction.

7. Fixtures shall be completely wired at the factory. Fixtures shall come with electrical wire whips in conformance with City of Los Angeles Electrical Code and in accordance with manufacturer's written instructions.

8. Leaks within fixtures and between fixtures and mounting surface shall not be tolerated.

9. Steel and aluminum fixtures, screws, bolts, nuts, and other fastening and latching hardware shall be cadmium or equivalent plated. For stainless steel fixtures, hardware shall be stainless steel or bronze. Fixtures must be assembled and gasketed properly to prevent galvanic action.

F. Low Voltage Luminaires:

1. Low voltage fixtures which use a remote transformer shall be supplied with transformers as necessary to complete a working installation. Transformers shall be supplied by the fixture manufacturer or approved by the fixture manufacturer to maintain UL rating.

2. Where remote transformers are specified, transformers shall be installed in accessible areas large enough to dissipate the heat of the transformer. Temperatures shall not exceed 100 degrees Fahrenheit (F).

3. Transformers shall be rated for operation on the electrical system voltage to which they are shown connected.

4. Transformers shall be mounted as close to the feed lampholders as practical to keep the secondary feed as short as possible.

5. Low voltage transformers shall be fused on the primary and secondary side with protection devices sized as appropriate to conductors, lamps, and transformers.

6. Contractor is responsible to lay out and install low voltage systems to prevent excessive light loss due to voltage drop.

7. Contractor shall install the system to meet City of Los Angeles Electrical Code.

G. Luminaire Lenses or Diffusers:

1. Plastic used for lenses and diffusers shall be formed of colorless 100 percent virgin acrylic as manufactured by Rohm & Haas, Dupont, unless otherwise noted on Drawings.

2. Glass used for lenses, reflectors, diffusers, and luminaires shall be tempered for high impact and heat resistance. The glass shall have a transmittance of not less than 88 percent, unless otherwise indicated on Drawings. For exterior luminaire use tempered borosilicate glass Corning number 7740.

3. Lenses, louvers, and other light diffusing elements shall be removable and positively held so that hinging or other normal motion shall not cause them to drop out.

4. Lenses shall be turned over to Department clean and free of dust or finger prints.

5. Unless otherwise noted on Drawings, metal halide luminaires shall be provided with heat and shock tempered glass enclosures capable of containment of hot quartz arc tube particles as recommended by luminaire and lamp manufacturers.

H. Lamps:

1. Provide lamps as indicated on the luminaire schedule and applicable Contract Documents.

2. Lamps for a specific fixture type shall be produced by 1 manufacturer. Do not mix lamp manufacturers.

3. Incandescent lamps shall be inside-frosted, rated at 120 volts, 2,500 hours, long-life type, unless otherwise specified in the fixture schedule.

I. Ballasts:

1. Ballasts for fluorescent fixtures shall be electronic programmed-start type capable of operating lamps at full light output with minimum input watts.

2. Ballasts shall be Philps Advance, Sylvania or GE, and matched to lamp for a complete, warrantied system.

3. Ballasts shall be Class P equipped with automatic resetting thermal protectors built in adjacent to the transformer coils. Ballasts shall be Electrical Testing Laboratory (ETL) tested and Certified Ballast Manufacturers (CBM) certified. Ballasts shall meet applicable American Standards Institute (ASI) and UL specifications regarding reliable starting, radio interference, dielectric and sound ratings.

4. Ballasts shall be high power factor; voltages shall be as specified in the fixture schedule.

5. Provide ballasts as required for switching as indicated on Drawings.

6. Single-lamp fluorescent luminaires within 10 feet of each other shall be tandem wired to eliminate unnecessary use of single lamp ballasts, e.g., a 2-lamp ballast shall be mounted in one of the luminaires to serve a single lamp in each the adjacent luminaires.

7. Fluorescent lamp ballasts shall be rigidly mounted to the inside of the luminaire housings, with ballast surfaces and housing in complete contact for efficient conduction of ballast heat to prevent overheating or cycling.

8. Ballasts shall be easily accessible and removable for replacement.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Contractor is responsible for coordinating the characteristics and UL labeling of the luminaires and their components with the ambient conditions which shall exist when the luminaires are installed. These areas of coordination include, but are not limited to, the following:

1. Wet Location labels

2. Damp Location Labels

3. Low Temperature Ballasts

B. Prior to ordering lighting equipment, Contractor shall verify locations and recess depths and final voltage. Additional charges for failure to verify locations shall not be allowed.

3.2 PREPARATION

A. Protection of adjacent Work:

1. Costs for protecting, removing, and restoring existing improvements shall be included in Contractor's bid.

2. Repair or replace existing improvements which are not designated for removal which are damaged or removed as a result of Contractor's operations. Repairs and replacements shall be equal to existing improvements, and shall match them in finish and dimension.

B. Protection of existing equipment:

1. For luminaire assemblies to be protected in place, enclose luminaire assembly in plywood enclosure and set warning barriers around enclosure.

2. For luminaire assemblies to be removed, protected, and re-installed Contractor shall:

a. Review condition of fixture with Engineer prior to removal. Condition shall be recorded in writing and fixture reference number attached to luminaire assembly to track during removal

b. After review of luminare assembly, Contractor shall remove assembly to protected storage.

c. Contractor shall refurbish luminare assemblies to "like new" condition by thoroughly cleaning assemblies and optics, replacing refurbished components as necessary, and installing all new lamps.

d. Contractor shall re-install luminaire assemblies as indicated on Drawings.

e. After installation of refurbished luminaire assembly, review overall condition of luminaire assembly with Engineer for final approval.

## 3.3 INSTALLATION

A. Provide luminaires at locations, and of types, as indicated on Drawings.

B. Notify Engineer about field conditions at variance with Drawings and/or Specifications before commencing installation. Failure to do so shall exonerate Engineer from responsibility for problems resulting from same, and Work required to correct the discrepancy shall be performed by Contractor with no additional compensation.

C. For bracket-mounted fixtures, provide metal plate attached to outlet box with threaded holes suitable for supporting the fixture rigidly in design position. Studs shall be steel or malleable iron, and galvanized. Die cast studs shall not be used. Electrical boxes shall be securely mounted and not move in the wall or shall be reset and wall refinished at Contractor’s sole cost and expense.

D. Install luminaires properly and safely. Provide hangers, rods, mounting brackets, supports, frames, yokes, support bars, and other equipment required for a complete installation.

E. Luminaires shall be complete with lamps of the type noted in the schedules and shall have metal parts, glassware, plastic diffusers, and the like, free from scratches, cracks, and other defects. Items damaged during shipment, handling, or installation shall be replaced at Contractor's sole cost and expense.

F. Lamps shall be operational at time of turn over to Department.

G. Luminaires shall be packaged with complete instructions and illustrations showing proper installation procedures. Install luminaires in strict conformance with manufacturer's written instructions.

H. Protect fixtures from damage during installation and up to time of acceptance by Engineer. Broken fixtures, glassware, plastics, and lamps shall be replaced by Contractor with new parts without expense to Department.

I. Whenever a luminaire is operated as a Work light during construction it shall be re-lamped with Project-specified lamp just prior to turnover of the area to Department.

J. Fixtures shall be installed so that no labels shall be visible under normal operating conditions of the fixture.

K. After installation, fill any voids between light pole bases and concrete base with non-shrink grout.

L. Install lamps in fixtures.

M. Metal halide lamps with a discernable color shift after 100 hours of operation shall be replaced with no additional cost to Department.

N. When multiple fixtures of a given voltage are mounted in trees, power shall be provided from base of tree to junction box on tree strap through single exterior grade armored cable with black coating (e.g. “Cora/Clad” or “Coleman Cable").

O. Remote ballasts, power supplies and transformers shall be concealed in dry, accessible locations unless otherwise directed by Engineer.

3.4 INTERFACE WITH OTHER WORK

A. Do not install louvers, diffusers, or lenses in lighting fixtures until glazing has been completed and construction Work involving plastering, grinding, sanding, painting, and final clean-up sweeping and dusting have been completed.

B. Clean reflector surfaces and lamps in lighting fixtures prior to installation of louvers, diffusers, or lenses.

C. Field Tests:

1. Run a complete burn test for the light fixtures and lamps installed for a duration of 5 days continuously. Repeat test for early burn outs. If premature lamp failure occurs, replace the lamp at no cost to Department and retest the fixture. Notify Engineer 5 Calendar Days prior to start of burn test.

2. Engineer shall perform an intensity test. Contractor shall make any necessary adjustments within the capability of the fixture, at no expense to Department.

## 3.5 AIMING AND ADJUSTING

A. Adjustable lighting units shall be aimed, focused, and locked, and the like, by Contractor under the supervision of Engineer.

B. Aiming and adjusting shall be carried out after installation is complete. Ladders and scaffolding required shall be furnished by Contractor at the direction of Engineer. As aiming and adjusting is completed, locking setscrews, bolts, and nuts shall be tightened securely.

C. Where possible, units shall be focused during normal working daytime hours. However, where daylighting interferes with aiming and focusing, the aiming shall be performed at night.

## 3.6 CLEANING AND PROTECTION

A. Clean lamps and reflectors with a lint-free cloth and mild solvent to remove any and all fingerprints, construction debris, etc. from lamps, reflectors and optics after installation.

B. Fixtures installed with plastic lenses shall be cleaned and de-staticized after installation. Install and leave with no fingerprints or dirt marks on the lens or diffuser. Use white gloves if necessary.

## 3.7 LIGHTING FIXTURE SCHEDULE

A. Refer to Drawings for lighting fixture schedule.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Fiber optic infrastructure including but not limited to:

1. Underground conduit system including ductwork, and cabling devices for the fiber optic cabling system.

2. Connect and test fiber optic cabling system, end-to-end. Conduct test as described in this Section.

B. This portion of Work establishes a conduit infrastructure for the installation and use of a fiber optic cable communications backbone. Underground conduit shall be backfilled with slurry backfill, in accordance with Drawings.

## 1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 26 00 01 - Basic Electrical Materials and Methods

C. Section 27 13 23 - Communications Optical Fiber Backbone Cabling

D. Section 31 23 33 - Trenching and Backfilling

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

## 1.4 SUBMITTALS

A. Submit shop drawings in completed groups of materials (i.e., conduit or cable). No parts of Work shall be ordered or performed until the respective submittal has been approved by Engineer.

B. Required submittals on electrical items and equipment shall include complete catalog information such as construction ratings, insulation systems, including manufacturer's certification that items or equipment meet or exceed Underwriters Laboratories, Incorporated (UL) and Trade Standards, and Specifications.

C. Materials list of items and equipment proposed to be provided for Work in this Section shall include the following as applicable, including bill of materials which shall note lead times:

1. Underground ducts and conduits.

2. Fiber optic installation equipment layout indicating exact location and dimensions of conduits, equipment, and clearances.

3. Pull boxes, termination panels, cabinets for systems, special terminals, equipment, and tube distribution enclosures.

D. Record Drawings: Provide in conformance with PROJECT RECORD DOCUMENTS Section.

1. Accurately indicate and dimension underground conduit runs, stub-outs, pull boxes, and cabinets on Project Record Drawings.

2. Initial and identify name and telephone number of installer on sheets as being a correct and accurate record of the installation.

E. Operation and Maintenance Manuals for microduct and installation equipment: Prior to final acceptance of Work, furnish 4 bound copies of operation and maintenance manuals for electrical equipment, as required in this Section. The contents shall include description of equipment, names of manufacturers, parts lists, model numbers, maintenance schedules, location of nearest facility for replacement parts or service, wiring and connection diagrams, internal schematic drawings, and other electrical and mechanical data necessary for operation and maintenance.

F. Test results as required in this Section including test summary sheet for tests.

G. Contractor shall provide the details of the End User training for individuals who shall be performing the installation during construction. Contractor shall also provide a list of installers and proof of completion of training, prior to installation of microduct.

H. Certification of Completion of Training from the manufacturer for the installers showing they are licensed installers who have completed official training.

I. Manufacturer’s warranty with minimum warranty duration of 20 years shall be compatible with existing system installed at Yusen Terminal (YTI) rail area for size, material, and capacity, equivalent or greater than existing.

1.5 QUALITY ASSURANCE

A. General:

1. Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.

2. Supply equipment and accessories new, free from defects and listed by UL or bearing its label. Special or custom equipment shall bear the label of laboratory recognized by City of Los Angeles Department of Building and Safety (LADBS).

3. Supply equipment and accessories in compliance with the applicable standards listed in this Section.

4. Items of a given type shall be the product of the same manufacturer.

5. Safety Policy: Prior to start of Work, Contractor shall complete Electrical Safety Policy-Implementation requirements as specified in BASIC ELECTRICAL MATERIALS AND METHODS Section.

6. Contractor shall be certified by manufacturer prior to Work.

1.6 WARRANTY

A. Contractor shall provide vendor warranty with minimum 20 years of coverage of vendor products installed under Contract.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

A. Materials shall comply with applicable legal requirements and standards specified in this Section.

B. The label or listing by UL shall appear on materials and equipment for which standards have been established by that agency.

C. Examine Drawings and Specifications and determine Work to be performed by the communications, electrical, and other trades. Provide the type and quantity of communications materials and equipment necessary to complete this Work and systems in proper operation, tested and ready for use.

D. Provide and install incidental items not indicated on Drawings nor mentioned in Specifications that belong to Work described or are required for complete systems.

E. Material items shall be new, and conform to grade, quality, and standards specified. Equipment and materials of the same type shall be a product of the same manufacturer throughout.

F. Provide protected splice enclosures in underground pull boxes for cable break out minitubes and homerun capabilities in coordination with fiber distribution as shown on Drawings.

G. Refer to COMMUNICATIONS OPTICAL FIBER BACKBONE CABLING Section for air compressor equipment requirements.

H. Provide and install manufactured products with the same quality as the basis of design manufacturer, Sumitomo.

I. Tube distribution shall be installed in conformance with manufacturer's written instructions.

J. Provide fittings, standoffs, tube distribution accessories, and conduit bodies matching the required conduit and standards.

2.2 MICRODUCT

A. Tube cables for installation in outside plant ducts shall be constructed of black polyethylene tubes having a 6 millimeter (mm) inside diameter and 8 mm outside diameter, wrapped with a non-conductive water-blocking tape, and jacketed in UV resistant black polyethylene. Tubes shall be numbered at regular intervals not to exceed 2 inches for identification.

1. Outdoor:

a. Microduct installed inside existing or new poly vinyl chloride (PVC) or rigid galvanized steel conduit shall be non-armored outside plant rated microduct, to the quality of Sumitomo, Inc. Model No. TC(XX)TOX or TC(XX)TOD. Where (XX) indicates number of tubes as indicated on Drawings. Tube cables for installation in outside plant ducts shall be constructed of black polyethylene tubes having a 6 mm inside diameter and 8 mm outside diameter, wrapped with a non-conductive water-blocking tape, and jacketed in UV resistant polyethylene. Tubes shall be numbered at regular intervals not to exceed 2 inches for identification.

b. Microduct installed directly into a trench shall be armored outside plant rated microduct to the quality of Sumitomo, Inc. Model No. TC(XX)TOX-2 or TC(XX)TOD-2. Where (XX) indicates number of tubes as indicated on Drawings. Tube cables for installation in direct burial applications shall be constructed of black polyethylene tubes having a 6 mm inside diameter and 8 mm outside diameter, wrapped with a non-conductive water-blocking tape, and jacketed in black polyethylene. The inner jacket shall be surrounded by a galvanized steel interlocking armor coated with an outer jacket of UV resistant black polyethylene. Tubes shall be numbered at regular intervals not to exceed 2 inches for identification.

c. Microduct installed in existing HDPE, under the channels shall be armored outside plant rated microduct to the quality of Sumitomo, Inc. Model No. TC(XX)TOX-2 or TC(XX)TOD-2. Where (XX) indicates number of tubes as indicated on Drawings. Tube cables for installation in direct burial applications shall be constructed of black polyethylene tubes having a 6 mm inside diameter and 8 mm outside diameter, wrapped with a non-conductive water-blocking tape, and jacketed in black polyethylene. The inner jacket shall be surrounded by a galvanized steel interlocking armor coated with an outer jacket of UV resistant black polyethylene. The tubes shall be numbered at regular intervals not to exceed 2 inches for identification.

d. Microduct installed overhead, on a new or existing pole, shall be armored outside plant rated microduct to the quality of Sumitomo, Inc. Model No. TC(XX)MSOS-2. Where (XX) indicates number of tubes as indicated on Drawings. Tube cables for installation in aerial applications shall be constructed of black polyethylene tubes having a 6 mm inside diameter and 8 mm outside diameter, wrapped with a non-conductive water-blocking tape, and jacketed in black polyethylene. The inner jacket shall be surrounded by a galvanized steel interlocking armor coated with an outer jacket of UV resistant black polyethylene. The tubes shall be numbered at regular intervals not to exceed 2 inches for identification.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Dimensions: Dimensions shown on Drawings (scaled, figured, or noted) are approximate, given for estimating purposes. Before proceeding with Work of this Section, carefully check and verify dimensions, sizes, and other related conditions for proper fitting in and attachment of materials and equipment to other equipment and to the structure.

3.2 INSTALLATION

A. Perform trench Work, pull box excavation, shoring, bracing, backfilling, and grading, as shown on Drawings and in conformance with BASIC SITE MATERIALS AND METHODS and TRENCHING AND BACKFILLING Sections and City of Los Angeles Department of Public Works Standards, and as specified in this Section. Pull boxes shall not be constructed until final conduit grading has been determined, including any field changes required by underground interferences.

B. Protect Work, materials, and equipment from damage. Provide adequate and proper storage facilities during the progress of Work. Storage outdoors shall be weather protected and shall include space heaters to prevent condensation. Provide for the safety and good condition of Work until final acceptance of Work by Department and replace damaged or defective Work, materials, and equipment before requesting final acceptance at no additional cost to Department.

C. Conduit and Equipment: Clean thoroughly to remove plaster, spattered paint, cement, and dirt on both exterior and interior.

D. Project Site Cleaning: Remove from Project Site packing cartons, scrap materials, and other rubbish relating to the installation.

E. Schedule necessary shutdowns of plant services with the tenant, through Engineer, and obtain permission from the tenant.

F. Proceed with Work without interfering with ordinary use of streets, aisles, passages, exits, and operations of the terminal unless proper permissions and permits are granted.

G. Contractor shall furnish required installation tools. Equipment shall be of substantial construction to allow steady progress once construction has begun. Makeshift devices which may move or wear in a manner to pose a hazard to the cable shall not be used.

H. Where not installed in continuous lengths, tube cable segments shall be spliced using couplings designed for that purpose.

I. Contractor shall supply the tube count including and considering the capacity of the required fiber strands that are called out on Drawings as a minimum, even if they are left empty for future growth. If tubes are left empty, Contractor shall install end caps and provide necessary protection.

J. Multiple conduit runs shall be supported on preformed, nonmetallic separators. Any separator containing metal shall have the metal noncontinuous and shall not form a magnetic loop in any manner. Spacing between separators shall be close enough to prevent sagging of conduits and breaking of couplings and watertight seals. Separators shall also be spaced a maximum of 8 feet on center. Separators shall be secured with cords where necessary and no wire ties, reinforcing rods or other metallic materials shall be placed around the conduits, either individually or in groups, in such a manner as to form a magnetic loop.

K. After the duct line has been completed, a standard flexible mandrel not less than 12 inches long, having a diameter approximately 1/4 inch less than the inside diameter of the conduit, shall be pulled through each conduit, after which a brush with stiff bristles shall be pulled through each conduit to make certain that no particles of earth, sand or gravel have been left in the line. Pneumatic rodding may be used to draw in the lead wire. A No.9 galvanized-iron pull wire free of kinks and splices shall be installed in unused ducts and shall extend a minimum of 3 feet into each maintenance hole.

L. Conduits or ducts, active or spares, entering a building or maintenance hole shall be completely and adequately sealed at first termination with quick-setting hydraulic cement or suitable plastic expansible compound to prevent the entrance into the building or maintenance hole of rodents, gases, or vapors.

M. Provide pull tape in each empty conduit for future use. Secure tape at both ends and provide with a minimum of 5 feet of slack. Pull tape shall be a woven multi-fiber polyester ribbon with a minimum width of 3/8-inch. Tape shall be permanently printed with the rated tensile strength (1,250 pounds minimum) and sequential footage markings. Identify each tape at the end of each line.

## 3.3 EXCAVATING, CUTTING, AND RESURFACING

A. Perform excavating, trenching, backfilling, and resurfacing Work where shown on Drawings, to support the installation of communications infrastructure and systems.

B. Excavating, trenching, backfilling, and resurfacing required for Work of this Section shall conform to the applicable requirements of BASIC SITE MATERIALS AND METHODS and TRENCHING AND BACKFILLING Sections. Excavating and backfilling connected with communications Work, repaving cuts, and providing and maintaining protective measures for the communications Work excavation required by the governing authorities having jurisdiction shall be performed as a part of Work of this Section.

## 3.4 LABELING

A. Contractor shall label each tube, and not each tube connection in Record Documents.

## 3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Tests: Conduct tests at portions of the installation as may be necessary to ensure full compliance with Drawings and Specifications. Perform tests in presence of Engineer. Costs of tests shall be at sole cost and expense of Contractor.

a. Provide instruments, equipment, labor, and materials to complete tests. Tests may be required on any item between installation of Work and end of 1 year warranty period. Should tests detect defective materials, poor workmanship, or variance with requirements of Specifications, Contractor shall make changes necessary and remedy defects at no additional cost to Department. The following tests shall be performed:

1) Airflow test to verify the integrity of the tubes and connections, using an air compressor and pressure gage at either end.

2) Pressure test to verify the pressure tightness of the tubes and connections. Each finished tube cable on its reel, is required to pass a 5 mm diameter steel ball from end to end using 70 pounds per square inch (psi) (plus or minus 10 psi) gas pressure.

3) Calibration test to verify the inner diameter of tubes and connections, so that fiber unit or mini cable can be accommodated.

4) Contractor shall provide air flow, air pressure, and continuity data for each tube installed.

2. System Acceptance:

a. Request for final review prior to system acceptance after:

1) Completion of installation of systems required under Contract Documents.

2) Submission and acceptance of operating and maintenance data.

3) Completion of identification program.

b. Acceptance is contingent upon the following:

1) Completion of final review and correction of deficiencies.

2) Satisfactory completion of acceptance tests which demonstrate compliance with performance and technical requirements of Contract Documents.

3) Satisfactory completion of training program and submission of manuals and drawings required by Contract Documents.

4) Installers of the microduct and enclosures shall be licensed and able to show proof of certification from manufacturer of microduct, or from program approved by Engineer. Installer shall have completed an approved official training program before the installation of any microduct or enclosure. Costs of installer licensing and certification shall be at sole cost and expense of Contractor.

3.6 TRAINING

A. Contractor shall provide hands on End User training of 8 hours minimum per person for 20 Department staff from the microduct manufacturer for installation. Training shall include training materials, a training location with the necessary equipment installed to perform the training, and an instructor with proficient knowledge and certification of the microduct product, provided by the manufacturer. Department shall provide classroom on Department property.

B. The classroom training shall provide each trainee with high-level operations knowledge of hardware components, including installation and maintenance of the microduct and airblown fiber product system, along with the necessary knowledge to properly maintain the network in operation of Project parameters. In addition, hands on training shall provide the trainee with the knowledge to properly maintain, install, and configure new components into the system.

C. Training shall be approved by Engineeer and shall result in a certificate for each trainee upon completion.

D. Contractor shall be responsible for classroom and hands on training including certification from the manufacturer for installers doing Work listed in this Article of this Section.

E. Contractor shall provide transportation, training materials, rental equipment, rental space, coordination, meals, and incindentals necessary to complete training.

F. Training under this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Fiber optic infrastructure including but not limited to:

1. Outdoor cabinets, frames, and enclosures, including locking devices, doors, foundations, and installation for the fiber optic cabling system.

2. Indoor racks and frames including doors, locking devices, and rack management systems.

B. This portion of Work establishes a conduit infrastructure for the installation and use of a fiber optic cable communications backbone. Communication cabinets, racks, frames, and enclosures shall be installed in conformance with manufacturer written instructions and in accordance with Drawings.

## 1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 26 00 01 - Basic Electrical Materials and Methods

C. Section 26 24 16 - Panelboards

D. Section 31 23 33 - Trenching and Backfilling

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

## 1.4 SUBMITTALS

A. Submit shop drawings in completed groups of materials (i.e., cabinets, racks, mounts, and the like). No parts of Work shall be ordered or performed until the respective submittal has been approved by Engineer.

B. Required submittals on electrical items and equipment shall include complete catalog information such as construction ratings, insulation systems, including manufacturer's certification that items or equipment meet or exceed Underwriters Laboratories, Incorporated (UL) and Trade Standards, and Specifications.

C. Materials list of items and equipment proposed to be provided for Work in this Section shall include the following as applicable, including bill of materials which shall note lead times:

1. Cabinets and Enclosures.

2. Splice case enclosures and accessories, including grommets, fittings, splice trays, and other related accessories.

3. Frames, termination panels, cabinets for systems, special terminals, equipment, and tube distribution enclosures.

D. Record Drawings: Provide in conformance with PROJECT RECORD DOCUMENTS Section.

1. Accurately indicate and dimension underground conduit runs, stub-outs, pull boxes, and cabinets on Record Drawings.

2. Initial and identify name and telephone number of installer on sheets as being a correct and accurate record of the installation.

E. Operation and Material data sheets for cabinets: Prior to final acceptance of Work, furnish 4 bound copies of operation and material data sheets for electrical equipment, as required in this Section. The contents shall include description of equipment, names of manufacturers, parts lists, model numbers, dimensions, location of nearest facility for replacement parts or service, wiring and connection diagrams, internal schematic drawings, and other electrical and mechanical data necessary for operation and maintenance.

F. Manufacturer’s warranty with a minimum warranty duration of 20 years.

1.5 QUALITY ASSURANCE

A. General:

1. Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.

2. Supply equipment and accessories new, free from defects and listed by UL. or bearing its label. Special or custom equipment shall bear the label of laboratory recognized by City of Los Angeles Department of Building and Safety.

3. Supply equipment and accessories in compliance with the applicable standards listed in this Section.

4. Items of a given type shall be the product of the same manufacturer.

5. Safety Policy: Prior to start of Work, Contractor shall complete Electrical Safety Policy-Implementation requirements as specified in BASIC ELECTRICAL MATERIALS AND METHODS Section.

6. Installers of the microduct and enclosures shall be licensed and able to show proof of certification from manufacturer of microduct, or from program approved by Engineer. Installer shall have completed an approved official training program before the installation of any microduct or enclosure. Costs of installer licensing and certification shall be at sole cost and expense of Contractor.

1.6 WARRANTY

A. Contractor shall provide vendor warranty with a minimum 20 years coverage of vendor products installed under Contract.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

A. Materials shall comply with applicable legal requirements and standards specified in this Section.

B. The label or listing by UL shall appear on materials and equipment for which standards have been established by that agency.

C. Examine Drawings and Specifications and determine Work to be performed by the communications, electrical, and other trades. Provide the type and quantity of communications materials and equipment necessary to complete this Work and systems in proper operation, tested and ready for use.

D. Provide and install incidental items not indicated on Drawings nor mentioned in Specifications that belong to Work described or are required for complete systems.

E. Material items shall be new, and conform to grade, quality, size, and standards specified. Equipment and materials of the same type shall be a product of the same manufacturer throughout.

F. Provide protected splice enclosures in underground pull boxes for cable break out minitubes and homerun capabilities in coordination with fiber distribution as shown on Drawings.

2.2 ENCLOSURES

A. Buried Enclosures: National Electrical Manufacturers Association (NEMA) 6R rain-tight to house fiber optic cable, patch panels, and splice enclosures, with re-enter capabilities.

B. Splice cases shall be steel re-enterable cases with face plates which are water tight. Splice cases shall be suitable for outside plant locations (underground, buried, or aerial).

C. Splice cases shall be to the quality and dimensions of the Splice Case Kit including the Performed Line Products (PLP) Armadillo Stainless Steel Shell Assembly and a minimum of 2 field drillable 3-section End Plates, Sumitomo Model No. SRP SP-F04-015.

D. Provide enclosure of sufficient size to house cable and equipment intended for installation. Contractor shall submit shop drawings and Engineer's approval prior to purchase of splice cases. Tube damaged during installation shall be the responsibility of Contractor.

E. Splice cases shall fix completely inside pull box located in, otherwise install a Sumitomo approved shrink wrap installation procedure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Dimensions: Dimensions shown on Drawings (scaled, figured, or noted) are approximate, given for estimating purposes. Before proceeding with Work of this Section, carefully check and verify dimensions, sizes, and other related conditions for proper fitting in and attachment of materials and equipment to other equipment and to the structure.

3.2 INSTALLATION

A. Cabinets and cabinet foundations shall not be constructed until final conduit grading and location has been determined, including any field changes required by underground interferences.

B. Conduit and Equipment: Clean thoroughly to remove plaster, spattered paint, cement, and dirt on both exterior and interior.

C. Tube Distribution: A NEMA-type enclosure suitable for Project Site environmental conditions shall be provided for tube distribution, routing, and termination. Tube distribution closures, tube distribution manifolds, Y-closures, and H-closures shall be installed conforming to manufacturer's written instructions, wherever several cables enter the same location or where cable type transitions take place. Contractor shall select the tube management hardware to meet Project Site conditions. Choose tube distribution unit based on the number of operations.

D. Contractor shall furnish required installation tools. Equipment shall be of substantial construction to allow steady progress once construction has begun. Makeshift devices which may move or wear in a manner to pose a hazard to the cable shall not be used.

E. Where not installed in continuous lengths, tube cable segments shall be spliced using couplings and enclosures designed for that purpose.

F. Contractor shall supply the tube count including and considering the capacity of the required fiber strands that are called out on Drawings as a minimum, even if tubes are left empty for future growth. If tubes are left empty, Contractor shall install end caps and provide necessary protection.

G. Contractor shall install splice case kits in conformance with manufacturer’s written instructions procedures for splice case kit installation.

## 3.3 EXCAVATING, CUTTING, AND RESURFACING

A. Perform excavating, trenching, backfilling, and resurfacing Work where shown on Drawings, to support the installation of communications infrastructure and systems.

B. Excavating, trenching, backfilling, and resurfacing required for Work of this Section shall conform to the applicable requirements of BASIC SITE MATERIALS AND METHODS and TRENCHING AND BACKFILLING Sections. Excavating and backfilling connected with communications Work, repaving cuts, and providing and maintaining protective measures for the communications Work excavation required by the governing authorities having jurisdiction shall be performed as a part of Work of this Section.

## 3.4 ENCASED DUCTS

A. Grade trenches and ducts to provide a minimum of 3 inch slope for each 100 feet of duct.

B. Multiple conduit runs shall be supported on preformed, nonmetallic separators. Any separator containing metal shall have the metal noncontinuous and shall not form a magnetic loop in any manner. Spacing between separators shall be close enough to prevent sagging of conduits, breaking of couplings, and watertight seals. Separators shall also be spaced a maximum of 8 feet on center. Separators shall be secured with cords where necessary and no wire ties, reinforcing rods, or other metallic materials shall be placed around the conduits, either individually or in groups, in such a manner as to form a magnetic loop.

C. Conduits or ducts, active or spares, entering a building or maintenance hole shall be completely and adequately sealed at first termination with quick-setting hydraulic cement or suitable plastic expansible compound to prevent the entrance into the building or maintenance hole of rodents, gases, or vapors.

## 3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Tests: Conduct tests at portions of the installation as may be necessary to ensure full compliance with Drawings and Specifications. Perform tests in presence of Engineer. Costs of tests shall be borne by Contractor. Provide instruments, equipment, labor, and materials to complete tests. Tests may be required on any item between installation of Work and end of one year warranty period. Should tests detect defective materials, poor workmanship, or variance with requirements of Specifications, Contractor shall make changes necessary and remedy defects at no additional cost to Department. The following tests shall be performed:

    a. Concrete slump test

    b. Connection test

    c. Grounding test: Refer to BASIC ELECTRICAL MATERIALS AND METHODS Section for requirements.

2. System Acceptance:

    a. Request for final review prior to system acceptance after:

        1) Completion of installation of systems required under Contract Documents.

        2) Submission and acceptance of material data sheets, operating, and maintenance data.

        3) Completion of identification and labeling program.

    b. Acceptance is contingent upon the following:

        1) Completion of final review and correction of deficiencies.

        2) Satisfactory completion of acceptance tests which demonstrate compliance with performance and technical requirements of Contract Documents.

        3) Satisfactory completion of training program and submission of manuals and drawings required by Contract Documents.

## 3.6 CLEANING

A. Remove from Project Site packing cartons, scrap materials, and other rubbish relating to the installation.

## 3.7 PROTECTION

A. Protect Work, materials, and equipment from damage. Provide adequate and proper storage facilities during the progress of Work. Storage outdoors shall be weather protected and shall include space heaters to prevent condensation. Provide for the safety and good condition of Work until final acceptance of Work by Department and replace damaged or defective Work, materials, and equipment before requesting final acceptance at no additional cost to Department.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fiber optic cable including but not limited to:

1. Underground fiber optic network installation including splicing, terminating, labeling, cable management, air blown fiber networking, testing, and cabling devices for the fiber optic cabling system.

2. Connect and test fiber optic cabling network, end-to-end.

B. This portion of Work establishes the installation and use of a fiber optic cable communications backbone.

1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 26 00 01 - Basic Electrical Materials and Methods

C. Section 27 05 43 - Underground Ducts and Raceways for Communications Systems

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. IEEE C2 - National Electrical Safety Code(R) (NESC(R)).

B. TIA-526-14 - Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant; IEC 61280-4.1 Edition 3.1, Fiber Optic Communications Subsystem Test Procedures- Part 4-1: Installed Cable Plant- Multimode Attenuation Measurement.

C. TIA-568.0 - Generic Telecommunications Cabling for Customer Premises.

D. TIA-598 - Optical Fiber Cable Color Coding.

E. TIA-606 - Administration Standard for Telecommunications Infrastructure.

1.5 SUBMITTALS

A. Submit shop drawings in completed groups of materials for cable (i.e., conduit or cable).

1. Product map showing use of required products showing interconnection between system components and subsystems, and indicating conformance with National Electrical Code (NEC), Underwriters Laboratories, Incorporated (UL), Telecommunications Industry Association (TIA)/Electronic Industries Alliance (EIA) listings, certifications, and specifications. Include detail and labels per strand and proposed location per strand, microtube layout and port destination.

2. Interface requirements, including connector types to external systems and systems or components not supplied by Contractor.

3. Rack mounts and panel type, accessories, size, manufacturer, manufacturer code, and proposed location.

4. Panel connectorization location schedule and labeling convention.

5. Enclosure, rack and panel type, size, manufacturer, manufacturer code, and proposed location, including but enclosure layout assembly.

6. Panel connectorization location schedule, line diagrams, connectors, and labeling convention.

B. Required submittals for fiber optic and electrical items and equipment shall include complete catalog information such as construction ratings, insulation systems, and manufacturer's certification that items or equipment meet or exceed UL standards, trade standards, and Specifications.

C. Contractor shall submit documented proof of licensing and certification, including individual’s name, date of certification, location of certification, and certifying company.

D. Manufacturer’s written instructions shall be a part of the cable submittals for installation.

E. Materials list of items and equipment proposed to be provided for Work of this Section. Include the bill of materials which shall note lead times and the following as applicable:

1. Patch panels, connectors, and fiber optic cabling.

2. Electrical equipment layout; including electrical testing materials indicating exact location and dimensions of conduits, equipment, and clearances.

3. Cabinets for fiber optic systems, special terminals, termination panels, equipment, rack mounts, and panels including accessories of the same manufacturer.

4. List of installation equipment, including model number, licensing and license lease if necessary, manufacturer, specification sheet, price, and necessary accessories associated for Work in this Section prior to purchase for Engineer's approval.

5. List of testing equipment, including model number, manufacturer, specification sheet, and test parameters for Work in this Section prior to purchase for Engineer’s approval.

6. Copy of the manufacturer’s printed reel documentation, including the following:

    a. Manufacturer’s reel number

    b. Manufacturer’s traceable batch number

    c. Length of the fiber cable on reel

    d. Maximum attenuation

    e. Minimum bandwidth

F. Patch Records

G. Record Drawings: Provide in conformance with PROJECT RECORD DOCUMENTS Section.

1. Accurately indicate and dimension cable lengths, splice joints, terminations, and microduct tube used per cable on Project Record Drawings.

2. Initial and identify name and telephone number of installer on sheets as being a correct and accurate record of the installation.

3. Report of fiber strand connection locations per fiber per patch panel.

4. Detailed line diagram showing each fiber with relative test reports associated per strand, per location, termination port location and final microtube layout.

H. Operation and Maintenance Manuals for Test Equipment: Prior to final acceptance of Work by Department, furnish both in hard copy and electronic file or compact disc (CD) format, Operation and Maintenance Manuals for equipment, as required in this Section. The contents shall include description of equipment, names of manufacturers, parts lists, model numbers, maintenance schedules, location of nearest facility for replacement parts or service, wiring and connection diagrams, internal schematic drawings, and other electrical/mechanical data necessary for operation and maintenance.

I. Test results as required in this Section.

J. Manufacturer’s warranty with a minimum warranty duration of 20 years.

1.6 QUALITY ASSURANCE

A. General:

1. Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.

2. Supply equiment and accessories new, free from defects, and listed by Underwriters Laboratories, Inc. or bearing its label. Special or custom equipment shall bear the label of laboratory recognized by City of Los Angeles Department of Building and Safety.

3. Supply equipment and accessories in compliance with the applicable standards listed in this Section.

4. Safety Policy: Prior to start of Work, Contractor shall complete Electrical Safety Policy-Implementation requirements as specified in BASIC ELECTRICAL MATERIALS AND METHODS Section.

5. Contractor shall employ certified system installation technicians who have experience in microduct installation, or who have received training in air blown cable installation technologies.

6. Material items shall be new, and conform to grade, quality, and standards specified. Equipment and materials of the same type shall be a product of the same manufacturer throughout.

7. The label or listing by UL shall appear on materials and equipment for which standards have been established by that agency.

B. Contractor shall be manufacturer certified to install the proposed submitted cabling system. Provide satisfactory evidence of certification in the form of a current letter or certificate from the manufacturer within 4 days of Award.

1.7 WARRANTY

A. Contractor shall furnish a warranty from the manufacturer, with a minimum 20 year coverage, for the communications cabling system. This warranty shall cover parts and labor for the duration of the extended warranty, as well as optical performance of the cabling system.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

A. Multimode 62.5/125 µm fiber strands shall meet or exceed the following geometry criteria:

1. Core diameter: 62.5 micrometer (µm), plus or minus 3.0 µm.
2. Cladding diameter: 125 µm, plus or minus 1.0 µm.
3. Core/Cladding Concentricity: less than or equal to 3 µm.
4. Minimum tensile strength: 100,000 pounds per square inch (psi)

B. Multimode 62.5/125 µm fiber strands shall meet or exceed the following performance criteria:

1. Attenuation: 3.4 decibel per kilometer (dB/km) at 850 nanometer (nm) and 1.0 dB/km at 1300 nm wavelengths, minimum.
2. Bandwidth: 200 mega hertz kilometer (MHz-km) at 850 and 500 MHz-km at 1300 nm wavelengths, minimum.

C. Materials shall comply with applicable legal requirements and standards specified in this Section.

D. Examine Drawings and Specifications and determine Work to be performed by the communications, electrical, and other trades. Provide the type and quantity of communications materials and equipment necessary to complete this Work and systems in proper operation, tested and ready for use.

E. Provide and install incidental items not indicated on Drawings nor mentioned in Specifications that belong to Work described or are required for complete systems.

F. Raw single mode fiber shall be coated by the same manufacturer for microduct conduit and installed in accordance with Drawings.

G. Provide and install manufactured products with the same quality as the basis of design manufacturer, Sumitomo.

H. Provide testing equipment for Optical Time Domain Reflectometer (OTDR) to the quality and capability of an OptiFiber OTDR by Fluke Networks Corporation.

I. Splice trays and accessories shall be compatible with patch panel and rack housing. Splice trays shall add 24 strands and be fusion splice compatible.

J. Contractor shall provide air compression equipment, attachments and accessories for air blown fiber installation or equivalent license lease and include in the corresponding Lump Sum Construction bid items of Bid Proposal Line Items.

2.2 FIBER OPTIC CABLE

A. General:

1. Cable shall be suitable for outdoor installations within underground pathways system and within inner duct and sub-ducting (in basketways, cable trays, conduit and hangers).

2. Optical transmission performance shall not be significantly affected by environmental fluctuations, installation, or aging.

3. Materials shall not evolve hydrogen in quantities that shall increase light attenuation.

B. Buffering:

1. Single mode fibers shall be loosely buffered, either in a core or tube or in multiple tubes around a central member.

2. Buffer tubes shall be dry (not contain gel).

3. Each buffer tube shall be color-coded for identification, and shall meet the requirements of TIA-598.

C. Sheath:

1. Sheath shall consist of a strength member and an outer jacket, with non-metallic component dielectric sheath.

2. Strength member: Aramid yarn, to the quality of Kevlar or equal, or reinforced fiberglass rods.

3. Jacket: Fluoropolymer thermoplastic.

4. Flame Rating: NEC Article 770, rated as Optical Fiber Nonconductive Plenum (OFNP), and UL listed as such.

5. Rated tensile load: 600 pounds maximum rated load.

6. Operating Temperature Range: Minus 40 to 158 degrees Fahrenheit (minus 40 to 70 degrees Celsius).

7. Installation Temperature Range: Minus 22 to 140 degrees Fahrenheit (minus 30 to 60 degrees Celsius).

D. Manufacturer:

1. Corning Cable Systems.

2.3 FIBER OPTIC PATCH PANELS

A. General:

1. Fiber optic patch panels shall be an enclosed housing for protecting, storing, and organizing the termination of the fiber cable(s) and fiber strands; [shall provide means to strain relieve and support of the cables (for standard pull only)]shall contain facilities to store fiber slack; and shall provide patch cord management.

2. Fiber optic patch panels shall be passive physical equipment and an apparatus used in terminating, interconnecting, and cross-connecting fiber optic cabling; shall possess a minimum fire resistant rating of UL 94V-1; and shall conform to current existing Occupational Safety and Health Administration (OSHA) Health and Safety Laws.

3. Fiber optic patch panels shall be rack mountable.

B. Fiber optic patch panels shall come equipped with safety labels such as laser identification or warning labels as required by system considerations.

C. Manufacturer:

1. Corning Cable Systems.

2.4 FIBER OPTIC CONNECTORS

A. Single mode fiber optic connectors appropriate for the mode type of fiber, and compatible with the equipment. Contractor shall coordinate connectors with equipment prior to purchase, LC connectors preferred.

2.5 CABINETS

A. Cabinets shall be Rack Solutions products, Model 42U Eclipse, 24 inches wide by 42 inches deep (45 inches overall depth).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Dimensions: Dimensions shown on Drawings (scaled, figured, or noted) are approximate, given for estimating purposes. Before proceeding with Work of this Section, carefully check and verify dimensions, sizes, and other related conditions for proper fitting in and attachment of materials and equipment to other equipment and to the structure.

B. Contractor shall verify the cable jacket and cable coating rating before purchasing cable from manufacturer for each installation area.

C. Provide the type and quantity of communications materials and equipment necessary to complete this Work and systems in proper operation, tested, and ready for use.

3.2 INSTALLATION

A. Perform cable installation, splicing and termination in conformance with manufacturer standard and written instructions, and as specified in this Section.

B. Optical fiber terminations shall be completed by qualified personnel utilizing state of the art equipment and techniques, who have obtained licensing approved by Engineer. Contractor shall submit documentation of licensing as described in Submittals Article of this Section.

C. Fiber Optic Cabling and Connectors: Clean thoroughly to remove debris, dirt, and dust on both exterior of cable and connector. Cable splices, terminations, and other installations shall be in a clean enclosed area. Cable splices shall be fusion spliced and installed in fusion splice compatible splice trays.

D. Cable pulling shall be in done in conformance with cable manufacturer’s written instructions and IEEE C2 standards. The bend radius of fiber optic cables shall not be less than 20 times the outer diameter of the cable during installation, nor shall the bend radius be less than 10 times the outer diameter in a static state; and not greater than the recommended manufacturer cable bend. Manufacturer's written instructions for pulling tensions shall not be exceeded. Any tube cable bent or kinked to a radius less than recommended shall not be installed.

E. Provide slack in each fiber bundle to allow for future re-termination in the event of connector or fiber end-face damage. Adequate slack shall be retained to allow termination at a 30 inch high workbench positioned adjacent to the termination enclosure(s). A minimum of 50 feet shall be retained in equipment rooms and telecommunication closets, and neatly coiled.

F. Bend angles shall not exceed 180 degrees between pull boxes. Contractor shall install intermediate pull boxes where angles between pull boxes exceed 180 degrees. If 3 or more 90 degree bends in a continuous run are unavoidable cable shall be installed from a central point.

G. Contractor shall notify and obtain approval from Engineer before adjusting or modifying termination locations, including but not limited to panels, switches, generators, telecommunication rooms, and non-fiber related items.

H. Cable installation (within the microduct) shall meet the required strand count as listed on Drawings. Contractor shall have a minimum number of distribution tubes as required to break out to the various locations named in this Project and the required strand count capacity without splicing to provide a node to node connection.

I. Backbone Cable Installation and Routing:

1. Cable runs shall have continuous sheath continuity, homogenous in nature. Splices are not permitted anywhere, unless expressly shown on Drawings or approved in writing by Engineer prior to installation.

2. Do not exceed 6,000 meters optical conductor length from the end termination equipment to the camera locations.

J. Placement:

1. Install cables within designated pathways.

2. Do not exceed the manufacturer's pulling tension. Use a pulling tension meter when using mechanical assistance during installation. Record maximum pulling tension for each cable run, and submit to Engineer for review if requested. Replace entire run when manufacturer's maximum pulling tension is exceeded.

3. Place and suspend cables in a manner to protect cables from physical interference or damage. Place cables with no kinks, twists, or impact damage to sheath. Replace cables damaged during installation.

4. Use UL only approved cable-pulling compounds when necessary to reduce pulling tensions.

5. Provide 20 feet minimum cable slack at the pull boxes and enclosures; store slack in fiber slack storage reel. Submit product for Engineer's approval prior to purchase for storage reel and coordinate products with enclosures.

6. Place a pull rope along with cables where run in conduit and space capacity remains. Tie off ends of the pull rope.

K. Routing:

1. Neatly dress and organize cables using designated cable routing facilities, and fasten to support devices via tie wraps or velcro-type straps.

2. Within enclosures, neatly dress and organize cables on designated cable support apparatus.

L. Termination:

1. Properly relieve strain from cables at termination points, within enclosures and equipment.

2. Provide breakout kits to furcated fibers from buffer tubes.

3. Terminate fiber strands at both ends using the specified fiber optic connectors appropriate for the mode type of fiber, and compatible with the equipment. Contractor shall coordinate connectors with equipment prior to purchase. Perform terminations in conformance with manufacturer's written instructions.

4. Provide required accessories and consumables for complete termination of fiber strands.

5. Provide 3 feet of unsheathed fiber (including buffer tube and broken out from the buffer tube) slack within the patch panel termination equipment enclosure at each end of the link. Properly store fiber slack in rear of patch panel into the “routing rings”, in conformance with manufacturer’s written instructions. Include “extension” slack loop/fold in the rear of the shelf to allow for the drawer to be pulled out without putting tension on the fibers.

6. Each run shall be from equipment to enclosure with no additional splices.

M. Fiber Patch Cords:

1. Install a 7-foot length of fiber optic patch cords from the rack-mounted fiber optic termination panel to the rack-mounted fiber optic video receiver modules.

N. Fiber Optic Cable Termination Panel:

1. Install a fully assembled termination panel in designated equipment enclosure. Contractor shall submit enclosure product and layout for Engineer’s approval prior to purchase and shall coordinate size and locations with other trades.

2. Provide accessories required for proper installation of each termination panel, including but not limited to, connector panels and adapters.

3.3 LABELING

A. General Requirements:

1. Labeling , identifier assignment, and label colors shall conform to TIA-606 Administration Standard as approved by Engineer prior to installation.

2. Provide permanent and machine generated labels. Hand written labels shall not be accepted.

B. Cable Labels:

1. Label format shall be wrap-around self laminating.

2. Label color shall be white background with clear laminating window.

3. Text color shall be black; text height shall be 1/8 inch high, minimum or number 12 font size.

4. Provide permanent and machine generated labels. Hand written labels shall not be accepted.

5. Provide label on both ends of cables. Fully wrap label around the cable jacket. Install labels no more that 4 inches from the edge of the cable jacket. Install labels such that labels are visible by a technician from a normal distance.

C. Termination Apparatus Labels:

1. Use labels included in product packaging.

2. Label color shall be white background with clear laminating window.

3. Text color shall be black; text height shall be 1/8 inch high, minimum or number 12 font size.

3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Tests: Conduct tests at portions of the installation to ensure full compliance with Drawings and Specifications. Perform tests in presence of Engineer. Costs of tests (excluding testing equipment) shall be at sole cost and expense of Contractor. Submit instruments, equipment, labor, and materials to complete tests to Engineer. Tests may be required on any item between installation of Work and end of 1 year warranty period. Should tests detect defective materials, poor workmanship, or variance with requirements of Specifications, Contractor shall make necessary changes and remedy defects at no additional cost to Department. The following tests shall be performed:

a. Test fiber optic cables using a power meter and stabilized light source capable of testing 1310 nm and 1550 nm for single-mode. Contractor shall complete a fiber optic post installation report at the time of testing containing meter readings at both 1310 nm and 1550 nm for single-mode in one direction on each fiber from both ends, actual loss and pertinent data regarding the cables tested, including model and serial number of test equipment, cable part number, installed fiber length, relevant building span loss at 1310 nm and 1550 nm, and date tested.

b. The fiber optic post installation report shall be a deliverable in an organized format. Testing is required for cabling. Testing equipment shall be of the same quality as a Noyes Products test equipment. Test fiber with an optical loss test set conforming to TIA-568.0-D.

c. Optical Time Domain Reflectometer (OTDR) test, copy of cable summary report for each cable terminated prior to installation. Contractor shall complete a fiber optic post installation summary report at the time of testing containing meter readings at both 1310 nm and 1550 nm for single-mode in one direction on each fiber from both ends, actual loss and pertinent data regarding the cables tested, including model and serial number of test equipment, cable part number, installed fiber length, relevant building span loss at 1310 nm and 1550 nm and date tested.

d. Use visual fault finder to test each strand of fiber. Contractor shall complete a fiber optic post installation summary report at the time of testing for every strand of fiber installed for acceptance for single-mode in 1 direction on each fiber from both ends. Report submittal shall include model and serial number of test equipment, cable part number, installed fiber length, location of installation, date tested, and test results.

e. Fibers utilized in the installation shall be traceable to the manufacturer. On the reel bandwidth performance as tested at the factory shall be provided upon request.

f. Tests shall detail the proposed test plan for each cable type including equipment used, test frequencies, wave lengths, name of the tester, and model number of test equipment used. Provide written reports of test data to Engineer.

g. Maximum attenuation from termination point to termination point is 0.7 dB loss.

h. Clean connections and adapters prior to taking measurements, in conformance with TIA-526-14.

i. Test jumpers shall be of the same fiber core size, performance, and connector type as the cable system.

2. System Acceptance:

    a. Request for final review prior to system acceptance after:

        1) Completion of installation of systems required under Contract Documents.

        2) Submission and acceptance of operating and maintenance data.

        3) Completion of identification program.

    b. Acceptance is contingent upon the following:

        1) Completion of final review and correction of deficiencies.

        2) Satisfactory completion of acceptance tests which demonstrate compliance with performance and technical requirements of Contract Documents.

        3) Satisfactory completion of training program and submission of manuals and drawings required by Contract Documents.

## 3.5 CLEANING

A. Remove from Project Site, packing cartons, scrap materials, and other rubbish relating to the installation.

## 3.6 PROTECTION

A. Protect Work, materials, and equipment from damage. Provide adequate and proper storage facilities during the progress of Work. Outdoor storage shall be weather protected and shall include space heaters to prevent condensation. Provide for the safety and good condition of Work until final acceptance of Work by Department. Replace damaged or defective Work, materials and equipment at no added cost to Department.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wi-Fi Communications System (WFCS), including, but not limited to:

1. Providing and installing network at various points as shown on Drawings and as described in Project Site specific scopes of Work.

2. Providing and installing platform of access points and enclosures as shown on Drawings and as described in Project Site specific scopes of Work.

3. Providing and installing networking equipment to manage access point.

4. Providing and installing WFCS with the following key features:

   a. Plug and play network

   b. Multiple SSIDs for public and private use

   c. Available iOS and Android monitoring apps

5. Training.

6. Performance Verification Testing (PVT) of equipment installed or relocated as a part of Contract.

7. Provide 1-year parts and labor warranty for equipment installed as a part of Contract.

8. Equipment and materials used shall be standard components that are manufactured and available for purchase as standard replacement parts as long as the product is commercially available from the manufacturer.

9. Manufactured products shall be thoroughly tested and proven in actual use.

10. Manufactured products shall include, at no additional cost, online support services and availability of a toll-free (U.S. and Canada), 24-hour technical assistance program (TAP) for emergencies.

11. The manufacturer shall repair or replace without charge, manufactured products proven defective in material or workmanship for the stated warranty period from the date of shipment.

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 05 42 - PVC Conduit

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be included in each corresponding bid item of Bid Proposal Line Items that requires data communications wireless access points.

1.4 REFERENCES

A. 47 CFR 15 - Radio Frequency Devices.

B. 47 CFR 15.107 - Conducted limits.

C. AS/NZS 4268 - Radio Equipment And Systems - Short Range Devices - Limits And Methods Of Measurement.

D. AS/NZS 60950-1 - Information technology equipment - Safety.

E. AS/NZS CISPR 22 - Information technology equipment—Radio disturbance characteristics—Limits and methods of measurement.

F. CSA C22.2 No. 60950-1 - Information Technology Equipment - Safety.

G. EN 55022 - Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.

H. EN 55024 - Information technology equipment - Immunity characteristics - Limits and methods of measurement.

I. EN 55032 - Electromagnetic compatibility of multimedia equipment - Emission Requirements.

J. EN 300328 - Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques.

K. EN 300386 - Telecommunication Network Equipment.

L. EN 301489-1 - ElectroMagnetic Compatibility (EMC) standard for radio equipment and services.

M. EN 301489-17 - ElectroMagnetic Compatibility (EMC) standard for radio equipment and services.

N. EN 301893 - 5 GHz RLAN.

O. EN IEC 61000-4-3 - Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test.

P. EN IEC 61000-6-1 - Immunity for residential, commercial and light-industrial environments.

Q. FCC Bulletin OET-65 - FCC Policy on Human Exposure to Radiofrequency Electromagnetic Fields.

R. IEC 60068 - Environmental Testing.

S. IEC 60529 - Degrees of Protection Provided by Enclosures (IP Code).

T. IEC 60950-1 - Information Technology Equipment – Safety - Part 1: General Requirements.

U. IEC 61000-4-2 - Electromagnetic Compatibility (EMC) - Part 4-2: Testing and Measurement Techniques - Electrostatic Discharge Immunity Test.

V. IEC 61000-4-4 - Electromagnetic Compatibility (EMC) - Part 4-4: Testing and Measurement Techniques – Electrical Fast Transient/Burst Immunity Test.

W. IEC 61000-4-5 - Electromagnetic Compatibility (EMC) - Part 4-5: Testing and Measurement Techniques - Surge Immunity Test.

X. IEC/EN 61000-4-8 - Testing and measurement techniques - Power frequency magnetic field immunity test.

Y. IEC/EN 61000-4-11 - Testing and measurement techniques.

Z. IEEE 802.1X - Local and Metropolitan Area Networks—Port-Based Network Access Control.

AA. IEEE 802.3 - IEEE Standard for Ethernet.

BB. IEEE 802.11 - IEEE Standard for Information Technology--Telecommunications and Information Exchange between Systems Local and Metropolitan Area Networks--Specific Requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications.

CC. MIL-STD-810 - Environmental Engineering Considerations and Laboratory Tests.

DD. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

EE. NFPA 70 - National Electrical Code.

FF. UL 60950-1 - UL Standard for Safety Information Technology Equipment – Safety – Part 1: General Requirements.

1.5 ACRONYMS

| | |
|---|---|
| AGC | Automatic Gain Control |
| API | Applications Programming Interface |
| API/SDK | Application Programming Interface/Software Development Kit. |
| ARP | Address Resolution Protocol |
| AWB | Automatic White Balance |
| BLC | Back Light Compensation |
| CBR | Constant Bit Rate |
| CCD | Charge Coupled Device. |
| CSM | Client Software Modules. |
| CVBR | Constant and Variable Bit Rate |
| DHCP | Dynamic Host Configuration Protocol. |
| DHCP | Dynamic Host Configuration Protocol |
| DNR | Digital Noise Reduction |
| DNS | Domain Name Server |
| DVRMS | Digital Video Recording & Management System. |
| EAP | Extensible Authentication Protocol |
| EO/IR | Electro-Optical/Infrared. |
| FOC | Fiber Optic Cable. |
| fps | frames per second |
| FTP | File Transfer Protocol |
| GUI | Graphical User Interface. |
| GUI | Graphical User Interface |
| HTTP | Hypertext Transfer Protocol |
| HTTPS | Secure Hypertext Transfer Protocol |
| ICMP | Internet Control Message Protocol |
| IGMP | Internet Group Management Protocol |

| | |
|---|---|
| IP | Internet Protocol |
| IR | Infrared. |
| IVA | Intelligent Video Analytics. |
| JPEG | Joint Photographic Experts Group |
| LAN/WAN | Local Area Network/Wide Area Network. |
| LDAP | Lightweight Directory Access Protocol |
| MJPEG | Motion JPEG |
| MM | Multi-mode Fiber Optic Cable. |
| MPEG | Moving Pictures Experts Group |
| NTP | Network Transfer Protocol. |
| NTP | Network Time Protocol |
| NTSC | National Television System Committee. |
| NVR | Network Video Recorder. |
| PoE | Power over Ethernet |
| PPPoE | Point-to-Point Protocol over Ethernet |
| PTZ | Pan, Tilt, Zoom |
| QoS | Quality of Service |
| RTP | Real-Time Transport Protocol |
| RTSP | Real-Time Streaming Protocol |
| SM | Single Mode Fiber Optic Cable |
| SMTP | Simple Mail Transfer Protocol |
| SNMP | Simple Network Management Protocol |
| SSH | Secure Shell |
| SSL | Secure Sockets Layer |
| SSM | Server Software Modules |
| TCP | Transmission Control Protocol |
| TCP/IP | Transmission Control Protocol / Internet Protocol |
| TWIC | Transportation Workers Identification Card |
| UDP | User Datagram Protocol |
| UPnP | Universal Plug and Play |
| VBR | Variable Bit Rate |
| VMS | Video Management System |
| WDR | Wide Dynamic Range |

1.6 SYSTEM DESCRIPTION

A. The new Wi-Fi Communications System within Project Site limits provides Wi-Fi connectivity for various areas which are of operational interest to Department. Department has determined that there are functional requirements for the system, including mounting locations which are subject viewing large public gathering areas, parking lots, public pathways, and semi-isolated areas, as well as areas which could benefit from enhanced coverage. Department intends to address public Wi-Fi connectivity through the following project objectives:

1. Installing new Wi-Fi network devices as indicated on Drawings.

2. Providing and installing new fiber optic and power network to support WFCS as shown on Drawings and as described in Project Site specific scopes of Work.

3. Wi-Fi Management System to include remote access capability as described in site specific scopes of Work.

4. Integration, programming and licensing of WFCS System as described in Project Site specific scopes of Work.

B. Contractor is responsible for equipment additions and system changes for Lump Sum proposed.

C. Refer to PART 2 of this Section for further system description.

1.7 SUBMITTALS

A. Shop Drawings: Indicate electrical characteristics and connection requirements, including system wiring diagram.

B. Product Data: Provide showing electrical and mechanical characteristics and connection requirements for each component. Provide an original manufacturers data sheet for each individual product. Where the data sheet reflects a range of products, the specific product utilized shall be indicated.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

D. Performance Verification Testing (PVT) Procedures and Reports: Submit plan indicating PVT methods, testing device calibration, and interpretations of test results for Field Acceptance Tests.

1. Submit PVT plan at least 20 days prior to the scheduled start of the first test. The test plan shall detail the objectives of tests.

2. Tests shall clearly demonstrate that Wi-Fi Communications system installations performed by Contractor fully comply with the performance requirements specified.

3. Progress payments shall depend upon the successful completion of testing and documentation.

E. Training Materials: Submit training documentation required under Training Article of this Section.

F. Project Record Documents: Record actual locations of new and relocated Wi-Fi devices and routing of any and new cabling.

G. Operation and Maintenance Data: Include routine trouble shooting procedures and instructions for new equipment installed as a part of Contract.

H. Warranty documentation

1.8 QUALITY ASSURANCE

A. Conform to requirements of any and standards of workmanship.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum 5 years documented experience and with service facilities within 500 miles of Project.

1. A minimum of 2 fully operational and commissioned sites are required utilizing the same version of hardware and software proposed for this facility.

2. Contractor shall provide references for sites required by Paragraph

B.1 of this Section including facility name, types of hardware and software installed, commissioning date, and facility contact person.

C. Verification of reference systems operation is a requirement for award.

D. Manufacturer shall have a minimum of 7 years of experience in producing Wi-Fi Communications systems (for exterior use) equipment.

E. Key Personnel Qualifications: Authorized installer of specified manufacturer with service facilities within 500 miles of Project.

1. Key personnel shall possess at least 2 years of successful installation experience with projects utilizing Open-Mesh Wi-Fi Systems, LAN/WAN, integration with existing systems, and wireless Work similar to that required for Project.

2. Installers shall be trained and authorized by the manufacturer to install, integrate, test, and commission the system.

3. Key personnel including Project Manager, Project Engineer, and Lead Installer shall provide information as to project experience.

F. Products: Furnish products listed and classified by Underwriters Laboratories Inc., Tories Inc., or International Organizations for Standardization (ISO), as suitable for purpose specified and indicated.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver Wi-Fi equipment in the manufacturer’s original, unopened, undamaged container with identification labels intact.

B. Store Wi-Fi equipment in a temperature environment protected from mechanical and environmental conditions as designated by the manufacturer.

1.10 WARRANTY

A. Manufacturer shall provide a limited 3-year warranty for the product to be free of defects in material and workmanship.

B. Manufacturer shall provide options to extend the warranty by up to 5 years at the time of initial purchase.

C. Period: Contractor shall warrant labor, workmanship, and materials for a period of 1 year from the date of final acceptance. Should a failure occur within this 1 year to the system, Contractor shall provide labor and materials necessary to restore the system to the condition required for the final test and acceptance for Contract, at no additional cost to Department.

1. Contractor shall offer an “Optional 1 Year Extended Warranty” package renewable for up to 3 years to Department. Department shall inform Contractor of the acceptance or rejection of the first year of the package prior to the expiration of the warranty period as noted above. Contractor shall provide a price for each year individually and this shall be available to Department. Contractor shall notify Department in writing 2 months prior to warranty expiration to determine the status of the optional 1 year warranty.

2. System Add, Changes, or Moves: During the warranty period, additional Wi-Fi devices and/or other equipment may be connected to the system and some Wi-Fi devices may be relocated or removed. Neither the installation of any new Wi-Fi devices, the connection of any new equipment nor the relocation/removal of any existing Wi-Fi devices shall void this warranty.

## PART 2 - PRODUCTS

### 2.1 SYSTEM

A. The systems shall consist of new, access point equipment, and associated controllers, encoders, switches, antenna, enclosures, mounts, power supplies, cabling, and any other associated or required part required for full system functionality. These shall be installed at various locations and connected back to Wi-Fi management system by existing infrastructure or Contractor provided infrastructure as shown on Drawings.

B. Contractor shall be responsible for installing equipment which meet or exceed the performance specifications in this Section, which Contractor shall procure, install, and make fully operational. Contractor shall test Wi-Fi devices for satisfactory functionality and as described in the scope of Work.

### 2.2 BASIC EQUIPMENT CAPABILITIES

A. Electrical drawings show conceptual layout drawings (separate documentation).

2.3 PRODUCT PERFORMANCE SPECIFICATIONS

A. Access point equipment shall be Cisco AIK-AP1562I-B-K9, and shall have the following capabilities at a minimum:

| | |
|---|---|
| 802.11ac Wave 1 and 2 Capabilities | 1562I: 3 X 3 MIMO with 3 spatial streams Multi- and single-user MIMO<br><br>Maximal ratio combining (MRC)<br><br>802.11ac beamforming (transmit beamforming) 20-, 40-, and 80-MHz channels<br><br>PHY data rates up to 1.3 Gbps (80 MHz in GHz)<br><br>Packet aggregation: A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx) |
| 802.11n (and related) capabilities | 1562I: 3 X 3 MIMO with 3 spatial streams MRC<br><br>20- and 40-MHz channels<br><br>PHY data rates up to 450 Mbps<br><br>Packet aggregation: A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx)<br><br>802.11 DFS CSD support |
| Data rates supported | 802.11a: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps<br><br>802.11b/g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, and 54<br><br>Mbps |

| | | |
|---|---|---|
| Maximum | 2.4 GHz | 5 GHz |
| number of | | |
| nonoverlapping | 802.11b/g | 802.11a: |
| channels | - 20 MHz: 3 | - 20 MHz: 27 |
| | 802.11n: | 802.11n: |
| | - 20 MHz: 3 | - 20 MHz: 27 |
| | - 40 MHz: 1 (hardware | - 40 MHz: 13 |
| | capable | 802.11ac: |
| | | - 20 MHz: 27 |
| | | - 40 MHz: 13 |

| | | |
|---|---|---|
| | | - 80 MHz: 6 |
| Interfaces | WAN port 10/100/1000BASE-TEthernet, autosensing (RJ-45), PoE in SFP port (fiber or electrical)<br>Management console port (RJ-45)<br>Multicolor LED<br>DC power input<br>Reset button | |
| Uplink options | Ethernet, SFP, and wireless mesh (future availability) | |
| Dimensions (L x W x D) | 1562I: 9.0 x 6.8 x 3.9 inch | |
| Weight | 1562I: 5.6 pounds | |
| Environmental | Operating tempurature:<br>-minus 40 to 149 degrees Fahrenheit (F) ambient airwith nosolar loading<br>-minus 40 to 131 degrees F ambient airwith solar loading Storage temperature: minus 40 to 185 degrees F<br>Humidity: 5 to 95 percent, non-condensing<br>Wind resistance:<br>-Up to 100 miles per hour (mph) sustained winds<br>-Up to 165 mph wind gusts | |
| Environmental ratings | -IEC 60529 IP67<br>-NEMA Type 4X<br>-Icing protection NEMA EN 10250-2008<br>-Corrosion NEMA EN 10250-2008 (600 hours)<br>-Solar radiation IEC 60068 -part 2, part 5 (1200 W/ m2)<br>-Vibration MIL-STD-810 | |
| Antennas | Integrated dual-band semi-omnidirectional antenna radome, (1562I) 7 dBi (2.4 GHz) | |
| Powering options | -AC (with AIR-PWRADPT-RGD1=, AC/DC outdoor power adapter)<br>-44-57 VDC input<br>-Universal Power of Ethernet (UPoE), 802.3at<br>-Cisco power injectors:<br>AIR-PWRINJ-60 RGD1=(outdoor rated, 60W, with NEMA<br>5-15 AC plug)<br>AIR-PWRINJ-60RGD2= (outdoor rated, 60W, unterminated AC cable) | |

| | |
|---|---|
| Compliance | Safety<br>-UL 60950-1<br>-CSA C22.2 No. 60950-1<br>-IEC 60950-1<br>-AS/NZS 60950-1<br>Immunity<br>-Less than or equal to 5 mJ f or 6 kV/3kA at 8/20 ms waveform<br>-ANSI/IEEE C65.41<br>-EN IEC 61000-4-3  Level 4 AC Surge Immunity<br>-IEC 61000-4-2  Level 2 ESD Immunity<br>-IEC 60950-1  Overvoltage Category IV<br>Radio Approvals<br>-47 CFR 15, 15.247, 15.407<br>-FCC Bulletin OET-65 C<br>-RSS-247<br>-RSS-102<br>-AS/NZS 4268<br>-EN 300328<br>-EN 301893<br>EMI and Susceptibility<br>-47 CFR 15.107,15.109<br>-ICES-003<br>-EN 301489-1<br>-EN 301489-17<br>Security<br>-Wireless bridging/mesh (future availability)<br>-X.509 digital certificates<br>-MAC address authentication<br>-Advanced Encryption Standard (AES)<br>Wireless Access<br>-802.11i, Wi-Fi Protected Access (WPA2), and WPA<br>-802.1X authentication, including Extensible Authentication Protocol (EAP) and Protected EAP (EAP-PEAP), EAPTransport Layer Security (EAP-TLS), EAP-TunneledTLS (EAP-TTLS), EAP-Subscriber Identity Module-(EAP-SIM), and Cisco LEAP<br>-VPN pass-through<br>-IP Security (IP sec)<br>-Layer 2 Tunneling Protocol (L2TP) |

| | |
|---|---|
| | -MAC address filtering |
| Warranty | 1-year limited hardware warranty |

B. Wireless Controller shall be Cisco Catalyst 9800-40-K9 Wireless Controller and shall have the following capabilities at a minimum:

| | |
|---|---|
| Maximum number of access points | Up to 2000 |
| Maximum number of clients | 32,000 |
| Maximum throughput | Up to 40 Gbps |
| Maximum WLANs | 4096 |
| Maximum VLANs | 4096 |
| Maximum Site Tags | 2000 |
| Maximum APs per Site | 100 |
| Maximum Policy Tags | 2000 |
| Maximum RF Tags | 2000 |
| Maximum RF Profiles | 4000 |
| Maximum Policy Profiles | 1000 |
| Maximum Flex Profiles | 2000 |
| Interfaces | 4x 10 GE/1 GE SFP+/SFP |
| Power supply | AC power with optional redundant AC power |
| Maximum power consumption | 381W |
| Deployment modes | Centralized, Cisco FlexConnect®, and Fabric Wireless (SD-Access) |
| Form factor | 1RU |
| License | Smart License enabled |
| Operating system | Cisco IOS XE |
| Management | Cisco DNA Center™ 1.2.8, Cisco Prime® Infrastructure 3.5, integrated WebUI, and third party (open standard APIs) |
| Interoperability | AireOS-based controllers with 8.8 MR2, 8.5 MR4, and 8.5 MR3 special |
| Policy engine | Cisco Identity Services Engine (ISE) 2.2, 2.3, and 2.4 |
| Cisco Connected Mobile Experiences (CMX) | CMX 10.5.1 |

| | |
|---|---|
| Access points | Aironet 802.11ac Wave 1 and Wave 2 access points |

1. Physical Dimensions

| | |
|---|---|
| Width | 17.3 inches |
| Depth | 19.5 inches |
| Height | 1.72 inches |
| Weight | 22.8 pounds |

2. Specifications:

| | |
|---|---|
| Wireless standards | IEEE 802.11 a, b, g, d, WMMe, h, n, k, r, u, w, ac Wave1 and Wave 2 |
| Wired, switching, and routing standards | IEEE 802.3 10BASE-T, IEEE 802.3 u 100BASE-TX, 1000BASE-T, 1000BASE-SX, 1000-BASE-LH, IEEE<br><br>802.1Q VLAN taggin, 802.1AX Link Aggregation |
| Data standards | -RFC 768 User Datagram Protocol (UDP)<br><br>-RFC 6864 IP<br><br>-RFC 7112 Implications of Oversized IPv6 Header Chains<br><br>-RFC 6918 Internet Control Message Protocol (ICMP)<br><br>-RFC 793 TCP<br><br>-RFC 5227 Address Resolution Protocol (ARP)<br><br>-RFC 8029 Requirements for Internet Hosts<br><br>-RFC 1519 Classless Interdomain Routing (CIDR)<br><br>-RFC 1542 Bootstrap Protocol (BOOTP)<br><br>-RFC 2131 Dynamic Host Configuration Protocol (DHCP)<br><br>-RFC 5415 Control and Provisioning of Wireless Access Points (CAPWAP) Protocol<br><br>-RFC 5416 CAPWAP Binding for 802.11 |

| | |
|---|---|
| Security standards | -Wi-Fi Protected Access (WPA)<br><br>-IEEE 802.11i (WPA2, RSN)<br><br>-RFC 1321 MD5 Message-Digest Algorithm<br><br>-RFC 1851 Encapsulating Security Payload (ESP) Triple DES (3DES) Transform<br><br>-RFC 2104 HMAC: Keyed-Hashing for Message Authentication<br><br>-RFC 2246 TLS Protocol Version 1.0<br><br>-RFC 2401 Security Architecture for the Internet Protocol<br><br>-RFC 2403 HMAC-MD5-96 within ESP and AH<br><br>-RFC 2404 HMAC-SHA-1-96 within ESP and AH<br><br>-RFC 2405 ESP DES-CBC Cipher Algorithm with Explicit IV<br><br>-RFC 2407 Interpretation for Internet Security Association Key Management Protocol (ISAKMP)<br><br>-RFC 2408 ISAKMP<br><br>-RFC 2409 Internet Key Exchange (IKE)<br><br>-RFC 2451 ESP CBC-Mode Cipher Algorithms<br><br>-RFC 3280 Internet X.509 Public Key Infrastructure (PKI) Certificate and Certificate Revocation List (CRL) Profile<br><br>-RFC 4347 Datagram Transport Layer Security (DTLS)<br><br>-RFC 8447 TLS Protocol Version 1.2 |
| Encryption Standards | -Static Wired Equivalent Privacy (WEP) RC4 40, 104 and 128 bits-Advanced Encryption Standard (AES: Cipher Block Chaining (CBC), Counter with CBC- |

| | |
|---|---|
| | MAC (CCM), Counter with CBC Message Authentication Code Protocol (CCMP)-Data Encryption Standard (DES): DES-CBS, 3DES-Secure Sockets Layer (SSL) and Transport Layer Security (TLS): RC4 128-bit and RSA 1024- and 2048-bit-DTLS: AES-CBC-IPsec: DES-CBC, 3DES, AES-CBC-802.1AE MACsec encryption |
| Authentication, Authorization, and Accounting (AAA) standards | -IEEE 802.1X -RFC 2548 Microsoft Vendor-Specific RADIUS Attributes-RFC 2716 Point-to-Point Protocol (PPP) ExtensibleAuthentication Protocol (EAP)-TLS-RFC 8044 RADIUS Authentication-RFC 2866 RADIUS Accounting Accounting-RFC 2867 RADIUS Tunnel Accounting-RFC 2869 RADIUS Extensions-RFC 3576 Dynamic Authorization Extensions to RADIUS-RFC 5176 Dynamic Authorization Extension to RADIUS-RFC 3579 RADIUS Support for EAP-RFC 3580 IEEE 802.1X RADIUS Guidlines-RFC 3748 Extensible Authentication Protocol (EAP)-Web-based authentication-TACACS support for management users |
| Management Standards | -Simple Network Management Protocol (SNMP) v1, v2c, v3-RFC 854 Telnet-RFC 1155 Management Information for TCP/IP-based Internets-RFC 1156 MIB-RFC 1157 SNMP-RFC 1213 SNMP MIB II-RFC 1350 Trivial File Transfer Protocol (TFTP)-RFC 3638 Ethernet MIB-RFC 2030 Simple Network Time Protocol (SNTP)-RFC 2616 HTTP-RFC 2665 Ethernet-Like Interface Types MIB-RFC 2674 Definitions of Managed Objects for Bridges with Traffic Classes, Muticast Filtering, and Virtual Extensions-RFC 2819 Remote Monitoring (RMON) MIB-RFC 2863 Interfaces Group MIB-RFC 3164 sYSLOG-RFC 3414 User-Based Security Model (USM) for SNMPv3-RFC 3418 MIB for SNMP-RFC 3636 Definitions of Management Objects for IEEE 802.3 MAUs-RFC 4741 Base NETCONF protocol-RFC 4742 NETCONF over SSH-RFC 6241 NETCONF-RFC 6242 NETCONF over SSH-RFC 5277 NETCONF event notifications-RFC 5717 Partial Lock Remote Proedure Call-RFC 6243 With-Defaults |

| | |
|---|---|
| | capability for NETCONF-RFC 6020 YANG-Cisco private MIBs |
| Management interfaces | -Web-based: HTTP/HTTPS-Command-line interface: Telnet, Secure Shell (SSH) Protocol, serial port-SNMP-NETCONF |
| Hard Disk Drives (HDD) | -SATA Solid-State Drive (SDD)-240 GB of memory |
| Environmental conditions supported | Operating temperature:-Normal 41 to 104 degrees F-Short term: 41 to 122 degrees FNonoperating temperature:-minus 104 to 149 degrees FOperating humidity:-Nomical: 5 to 85 percent, no-condensing-short term: 5 to 90 percent noncondensingNonoperating temperature humidity:5 to 93 percent ar 82 degrees FOperating altitude:-Appliance operating: 0 to 10,000 feet-Appliance nonoperating: 0 to 40,000 feetElectrical input:-AC input frequency range: 47 to 63 Hz-AC input frequency range: 90 to 264 VAC with AC PEM-1100W AC with optional redundant power supply (hot-swappable)Maximum power: 381WHeat dissipation: 1,300 BTU/hrSound power level measure:-A-weighted sound power level is 74.1 LpAm (dBA) at 27C nominal operation |
| Regulatory compliance | Safety:-UL 60950-1 -IEC/EN 60950-1-AS/NZS 60950-1 -CSA C22.2 No. 60950-1 EMC-Emissions: -47 CFR 15<br>-AS/NZS CISPR 22 - CISPR 22<br>-EN 55022 /EN 55032 (EMI-1)-ICES-003-VCCI-KN 32 (EMI-2)-CNS-13438EMC-Emissions:-EN61000-3-2 Power Line Harmonics (EMI-3)-EN61000-3-3 Voltage Changes, Fluctuations, and Flicker (EMI-3)EMC-Immunity:<br>-IEC 61000-4-2  Electrostatic Discharge Immunity<br>-EN IEC 61000-4-3  Radiated Immunity<br>-IEC 61000-4-4  EFT-B Immunity (AC Power Leads)<br>-IEC 61000-4-4  EFT-B Immunity (DC Power Leads)<br>-IEC 61000-4-4  EFT-B Immunity (Signal Leads)<br>-IEC 61000-4-5  Surge AC Port<br>-IEC 61000-4-5 Surge DC port-IEC/EN 61000-4-6 Immunity to Conducted Disturbaces |

| | |
|---|---|
| | -IEC/EN 61000-4-8 Power Frequency Magnetic Field Immunity<br>-IEC/EN 61000-4-11 Voltage Dips, Short Interruptions, and Voltage Variations-K35 (EMI-2)EMC (ETSI/EN)<br>-EN 300386 (EMC)(EMC-3)<br>-EN 55022 Information Technology Equipment (Emissions)<br>-EN 55024/CISPR 24 Information Technology Equipment (Immunity)<br>-EN IEC 61000-6-1 Generic Immunity Standard (EMC-4) |

C. Network Switch:

1. Network switch shall be CISCO C9500-40X-A with C9500-NM-2Q C1A1TCAT95001-5Y, PWR-C4-950WAC-R/2 as manufactured by Cisco, (800) 553-6387.

D. Licensing:

1. A 5 year license shall be purchased for wireless access point, controller, switch, and any other associated necessary to operate the wireless system. Contractor shall transfer associated license to Harbor Department Port of Los Angeles Information Technology Network Group.

2.4 CERTIFICATIONS

A. FCC

B. IC

C. CE

D. CTick

## PART 3 - EXECUTION

### 3.1 PREPARATION

A. Contractor shall investigate Project Site and become thoroughly familiar with the facility.

B. Contractor shall plan WFCS installation such that it is concurrent with the power and communication systems installation.

C. Access point locations require approval prior to installation.

D. Comply with applicable governmental regulations regarding radio frequency transmissions and interference, including FCC and FAA.

E. Exterior infrastructure and equipment designs shall be stamped and signed by a State of California registered engineer and stated as 80 miles per hour (mph) wind-rated.

### 3.2 INSTALLATION

A. Contractor personnel shall comply with applicable state and local licensing requirements.

B. Contractor or subcontractors main resources within Project shall carry proper professional certification issued by the manufacturer and verified by a third party organization to confirm sufficient product and technology knowledge.

1. Contractor shall carefully follow instructions in documentation provided by the manufacturer to ensure steps have been taken to provide a reliable, easy-to-operate system.

C. Equipment shall be tested and configured in conformance with manufacturer’s written instructions provided prior to installation.

D. Firmware found in products shall be the latest and most up-to-date provided by the manufacturer, or of a version as specified by the provider of Wi-Fi Communications Management Application.

E. Equipment requiring users to log on using a password shall be configured with user/site-specific password/passwords. No system/product default passwords shall be allowed.

F. A proper installation shall be in conformance with NFPA 70 and the guidelines of that year’s revision. When properly installed equipment meets Low Voltage, Class 2 classification of NEC.

G. Install in conformance with manufacturer's written instructions.

H. Identification: Install permanent identification labels on conduits, junction boxes, conductors, and termination blocks.

I. Exterior equipment to sustain 80 mph winds and indicate Compliance in Proposal and Submittals.

J. Installation with minimal disruption of Port Operations and installation and pre-installation activities are to be coordinated with Engineer and affected Port tenants.

K. Contractor shall be fully responsible for any damage(s) caused by Work and shall repair damage(s) including utilities and railroad related infrastructure and equipment at no additional cost to Department.

L. Specific Scopes of Work:

1. Open Areas, Pathways, and Parking Lots:

a. Provide fixed access points at locations as shown on Drawings.

b. Position fixed access points such that optimal coverage is provided in areas within range of the access points.

c. Position fixed access points such that connectivity links to not exceed maximum range.

d. Procure, provide, install, and make fully operational new fixed access points, enclosures and ancillary equipment and which meet or exceed Specifications.

2. Power and Data Network:

a. Install and make fully operational power and data network in accordance with Drawings and Specifications.

## 3.3 PREPARATION

A. The network design and configuration shall be verified for compatibility and performance with access point equipment.

B. Network configuration shall be tested and qualified by Contractor prior to Wi-Fi system installation.

## 3.4 INSTALLATION

A. Before permanent installation of the system, Contractor shall test the system in conditions simulating the final installed environment

1. A report indicating successful test results shall be produced.

B. Contractor shall follow manufacturer-published guidance on proper installation and configuration of Wi-Fi network.

## 3.5 STORAGE

A. The access point hardware shall be stored in an environment where temperature and humidity are in the range specified by the manufacturer.

## 3.6 FIELD QUALITY CONTROL

A. Safety coordination in conformance with city, state, and federal requirements.

## 3.7 ADJUSTING

A. Antenna shall be installed as to be facing the direction that results in the most optimal connectivity.

B. Field Adjustment: Aim each antenna for the optimum connectivity and broadcast to the area that is intended to cover. Final aiming shall be approved and accepted by Engineer.

C. Touch-Up Work: Touch-up scratched and marred surfaces to match original finishes; remove dirt and construction debris.

## 3.8 CLOSEOUT ACTIVITIES

A. Demonstrate system operation and provide 2 hours of instruction with manufacturer's training personnel.

B. Conduct walking tour of Project and briefly describe function, operation, and maintenance of each component.

C. System Testing and Acceptance: Upon installation of each Wi-Fi device perform an installation test meeting the following requirements:

1. The installation test shall include confirmation of the coverage areas as scheduled and shown on Drawings and verification that connectivity is being injected into the project areas as specified. Test at junctions from the input device to system output.

2. Any problems encountered, including damage to Department equipment during this test, shall be documented and brought to Engineer's attention and corrected at Contractor's sole cost and expense. Contractor shall promptly correct problems encountered, providing field service personnel appropriately trained for the types of problems encountered.

3. Contractor shall supply a form to be used during these tests for authorization and initialing by Engineer and Contractor.

    a. This form shall clearly define the items tested, leaving room for the date, access points element designation, confirmation of connectivity areas, and initials.

    b. Automated functions shall be demonstrated to ensure operation as required by Specifications and Drawings.

D. Acceptance shall be withheld until the successful completion of the following:

1. Acceptance of submittals.

2. Delivery of final documentation.

3. Wi-Fi antennae aiming and approval.

4. System programming.

5. Successful testing.

6. Successful demonstration and training, including verification of proper operation to meet specified performance criteria for Wi-Fi system.

## 3.9 TRAINING

A. Provide documentation highlighting changes to the system. Documentation shall include, but not be limited to, operations manuals for any new equipment installed and as-built drawings showing changes to the existing system.

B. Provide 2 hours of user training on any new hardware installed as a portion of Contract.

C. Provide 2 hours of maintenance training on any new hardware installed as a portion of Contract.

D. Provide 8 hours of user training on any new software installed as a portion of Contract.

E. Provide 4 hours of administrator training on any new software installed as a portion of Contract.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Ring-down emergency telephones, underground ducts, and electrical and communication wiring.

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 28 20 00 - Video Surveillance

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

B. ASTM D523 - Standard Test Method for Specular Gloss.

C. ASTM D714 - Standard Test Method for Evaluating Degree of Blistering of Paints.

D. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

E. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

F. ASTM D3359 - Standard Test Methods for Rating Adhesion by Tape Test.

G. UL 2017 - UL Standard for Safety General-Purpose Signaling Devices and Systems.

H. UL 60950-1 - UL Standard for Safety Information Technology Equipment – Safety – Part 1: General Requirements.

1.5 SUBMITTALS

A. Shop Drawings: Submit catalog cuts, descriptive data, guides, installation manual, product configuration sheet, product sheets, structural design, specification sheets of the ring-down emergency telephone.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Any specialty tool or key used to service ring-down emergency telephone shall be part of the deliverables.

1.7 WARRANTY

A. Units shall be warrantied against any defects in material and workmanship, under normal use, for a period of 2 years from date of installation. If system is found by manufacturer to be defective within the warranty period, manufacturer shall repair and/or replace any defective parts, provided the equipment is returned to manufacturer.

PART 2 - PRODUCTS

2.1 RING-DOWN EMERGENCY TELEPHONES

A. Model No. CB 1-s with IA4100 by Code Blue Corporation, (800) 205-7186

2.2 MATERIALS

A. The unit shall be a vandal-resistant communications device that is a multi-

B. functional, freestanding pedestal constructed of carbon steel. It shall include a high quality, hands-free communications device illuminated by a high intensity faceplate light, a powerful combination blue beacon strobe light and an area light that serve to easily identify it from a distance.

2.3 DESIGN

A. The following criteria shall be used for design, but shall not minimize Drawing requirements:

1. Unit shall be a cylinder constructed in conformance with ASTM A500/A500M seamless carbon steel structural tube, Schedule 20, 12.75 inch outside diameter by 0.25 inch thick wall, at a height of 108 inches and weigh approximately 375 pounds.

2. Unit shall have an internal anchor base plate that is metal inert gas (MIG) welded 2 inches above the base and fabricated with a minimum of 1/2 inch thick A36 grade steel plate, with a 5 inch diameter center hole for electrical conduit access. Base plate shall have 4 oblong holes on an 8 inch circular bolt pattern for attachment.

3. Access door shall measure 14 inches high by 9.64 inches wide placed 10.94 inches from the bottom of the base to provide access for mounting to the anchor bolts and connectivity to electrical facilities. Opening shall have a cover plate, which mounts flush and is same steel and radius as the unit. Cover plate shall be held in place by 2 counter sunk fasteners, fit into the opening, and have a weather-resistant gasket.

4. Tamper resistant fasteners manufactured by same ring-down emergency telephone manufacturer shall be used.

5. Two (2) area light openings 10 inches high and 17 inches wide with 153 degrees of arc each, shall be cut opposite each other, with the bottom of the openings approximately 14 inches from the top.

    a. A heavy cylindrical lens made of clear ultraviolet (UV) rated polycarbonate shall be inserted behind the openings and be mechanically and chemically fastened to the interior. Lens shall be fully sealed and treated to prevent damage from ultra-violet radiation, aging, cracking, yellowing or breaking.

        1) A recessed opening shall be cut at a point beginning 36.6 inches above the bottom of the unit. Opening shall be 15.1 inches tall at the

            a) forward edge and 12.8 inches tall at the rear edge, creating a 25 degree angle from the horizontal and an arc of 160 degrees in the face.

B. Opening shall be enclosed by a 7 gage steel plate with a single opening for a communication device.

## 2.4 ELECTRICAL

A. Electrical components shall have a modular plug for easy service and replacement, and shall be equipped with a fuse for protection from transient voltage conditions. Components requires 2.5 ampere at 24V AC. Voltage input shall be 120V then step down to 24V AC for electronics.

2.5 LIGHTING

A. Light-Emitting Diode (LED) Beacon/Strobe: Located in the dome top assembly with a rating of no less than 270 lumens per 92 candela, shall have a factory-set flash rate of up to 375 flashes per minute and be programmable. A deep blue UV-rated polycarbonate prismatic refractor shall surround LED beacon/strobe and be used to distribute the light in a horizontal pattern for maximum brightness and visibility.

B. The communication device shall be factory programmed to activate LED beacon/strobe for the duration of a call.

C. LED beacon/strobe shall be 5.10 inches tall and 5.5 inches in diameter.

D. Area Light: LED area light shall be protected within the 2 light openings by a 0.13 inch thick UV-rated polycarbonate lens and be used to distribute the light in a horizontal and vertical pattern.

1. A reflector disk shall be mounted above to direct light outward and downward, and measure 17 inches wide by 10 inches high with the opening 14 inches from the top and an arc of 153 degrees. Lumen rating shall be 852.

E. Faceplate Light: LED shall direct light onto the communications device and be vandal resistant. Opening shall measure 4.5 inches wide by 50 inches high. Light shall have a lifetime of 100,000 hours.

2.6 HANDS FREE COMMUNICATION DEVICE

A. Unit shall have an analog speakerphone communication device constructed with a rating of IP56 or National Electrical Manufacturers Association (NEMA) 4X. It shall have user programming capabilities, reliability, auxiliary functions, fault monitoring and reporting, and public address system control. Standard touch sensitive buttons, cast bezels with Braille signage, dual call progress indicators and conformal coated printed circuit boards (PCBs) set the industry standard for an emergency communications device.

2.7 UNIT CONSTRUCTION

A. Faceplate shall measure 8.5 inches wide by 11.75 inches high by 2.56 inches deep with 6 screw holes.

B. Faceplate shall be constructed of 0.104 inch thick stainless steel with custom-designed, vandal-resistant microphone and speaker openings.

C. An 8.5 inches wide by 11.75 inches high by 0.96 inches deep rubber gasket shall be on the back of the faceplate.

D. Stainless steel screen shall be mounted between the faceplate and speaker for additional vandal resistance and weatherproofing.

E. A 3.5 inch weatherproof speaker and optional keypad shall be mounted via 1/2 inch stainless steel studs, locking washers and lock nuts.

F. Piezoelectric buttons that are self-monitoring and contain no mechanical parts shall be mounted in a cast aluminum bezel via locking nut and rubber washer.

G. Button bezels shall be made of cast aluminum and mounted via stainless steel studs, locking washers and lock nuts.

H. Optional Americans with Disabilities Act (ADA) compliant tactile and fully customizable bezel designs made of acrylic and aluminum shall be available.

I. One (1) - 0.42 inch red LED light and one (1) - 0.42 inch green LED light shall be utilized beneath “CALL PLACED” and “CALL RECEIVED” signals.

    1. Aluminum stand offs and locking washers shall be utilized to mount conformal coated electronics. A molded plastic housing shall be secured with aluminum standoffs, locking washers and stainless steel screws. Weatherproof modular connectors shall be utilized for external power, auxiliary, PAS control, communication, audio output connectivity.

        a. Faceplate shall have an optional four-coat paint process, with zinc-rich primer for corrosion resistance and baked-on polyurethane enamel for maximum gloss and shine.

            1) Clear coating to provide additional environmental protection

J. Features of unit shall be as follows:

    1. The unit shall have a single 28 millimeter self-monitoring data button for activation. The button shall be labeled “EMERGENCY”.

    2. The unit shall have 9 number storage capabilities, and 9 digital messages with up to 30 seconds each.

    3. The unit shall have 4 button inputs.

    4. The unit shall also have 2 auxiliary inputs and 3 auxiliary outputs.

        a. Three (3) Normally Open (NO) and 3 Normally Closed (NC).

5. The unit's sleep mode shall be less than 4 mA power draw.
6. The unit shall have multiple programming options, including silent monitoring from a remote location, immediate PAS mode and programmable ring time.
7. The unit shall have self-monitoring capability and fault reporting for loss of power, low battery voltage and PAS speaker and amplifier.
8. There shall be multiple password protection levels for security.
9. It shall be built with powerful DSP technology.
10. It shall have an operational temperature of minus 40 degrees F to 158 degrees F (minus 40 degrees C to 70 degrees C).
11. The following criteria shall be used for power:
    a. 12 to 24V AC/DC primary power supply
    b. 12V DC auxiliary power supply
    c. SLA/AGM battery backup:
        1) 504 hours standby
        2) 40 hours talk time
            a) Non-volatile memory ensures programming is retained during power loss.

K. Unit shall be in compliance with the following:
1. Braille symbols and 2 highly visible LED indicators for ADA compliance.
2. Connects with Lenel OnGuard to monitor phone and call status.
3. Delivers event notifications to OnSSI Ocularis video management software.
4. UL 60950-1 and UL 2017 listed.

L. Electronic Industries Alliance/Telecommunication Industries Association (EIA/TIA), American National Standards Institute (ANSI), Compliance, Safety, Accountability (CSA), and Building Industry Consulting Service International (BICSI) cabling or similar standards shall be adhered to for proper operation of devices connected to copper or fiber infrastructure.

2.8 FINISH

A. Substrate preparation shall be in conformance with applicable impact and adhesion American Standards Testing Materials (ASTM International) standards: ASTM D2794, ASTM D523, ASTM D3359, ASTM D1654, and ASTM D714.

B. The polyurethane finish shall be a multi coat system in safety blue.

1. Custom colors shall be available.

C. Minimum coverage thickness of 2.0 mils.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install ring-down emergency telephones in conformance with manufacturer’s written instructions.

B. Electrical: Wiring shall be in conformance with National Electric Code (NEC), National Fire Protection Agency (NFPA), and Institute of Electrical and Electronics Engineers (IEEE) standards for proper safety and operations of connected equipment to the infrastructure.

C. Communication: Communication wiring shall conform to NEC, EIT/TIA, ANSI, CSA and BICSI cabling standards and shall be adhered to for proper operation of devices connected to copper or fiber infrastructure.

D. Ring-down emergency telephones shall be connected to pan tilt zoom (PTZ) camera to trigger presets when the design requires this functionality.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Engineer shall conduct a functionality test. Contractor shall make necessary adjustments within the capability of the equipment.

2. Perform burn test of the light fixtures and equipment for 5 continuous days. If premature lamp or equipment failure occurs, replace material at Contractor's sole cost and expense and retest the equipment. Notify Engineer 5 Calendar Days prior to start of burn test.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Security system related equipment and installations.

## 1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work in this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. 47 CFR 15 - Radio Frequency Devices.

B. CSA C22.2 No. 107.3 - Uninterruptible Power Systems.

C. IEC 62040-1 - Uninterruptible Power Systems (UPS) - Part 1: Safety Requirements.

D. IEC 62040-2 - Uninterruptible Power Systems (UPS) - Part 2: Electromagnetic Compatibility (EMC) Requirements.

E. IEEE 519 - IEEE Standard for Harmonic Control in Electric Power Systems.

F. UL 1449 - Standard for Surge Protective Devices.

G. UL 1778 - Uninterruptible Power Systems.

## 1.5 SUBMITTALS

A. Shop drawings shall consist of the following minimum items:

1. An electrical schematic diagram reflecting the integration of Uninterruptible Power Systems (UPS) with the input power source, external maintenance bypass switch, and the equipment powered by UPS outputs.

2. A set of drawings showing the physical size and configuration of UPS and controls.

3. A description of UPS performance.

4. A description of the individual UPS components.
5. A description of the operation of UPS.
6. The manufacturer's written guarantee.

B. Other drawings, data and specification sheets, or details are required to fully describe UPS, its construction, assembly or operation.

C. Five complete sets of operation and maintenance manuals shall be provided at project closeout. These manuals shall be applicable to the rectifier, inverter, battery, battery charger bypass, maintenance bypass switch, control, and other components of the assembly. The manuals shall include:

1. Photographs and drawings of critical assemblies and operational/status panels, with call- out labels.
2. A complete maintenance program, including trouble-shooting and diagnostic procedures, incorporating waveform, voltage, current, and frequency checks at critical and semi-critical points in the system.
3. Subassembly/component calibration and adjustment specification and procedures.
4. Procedures for subassembly, part and component repair of replacement without reduction in rated output capacity.
5. A complete power flow/signal block diagram of UPS reduced to subassemblies which show overall system operation.
6. Circuit schematics and wiring diagrams.
7. Safety precautions.
8. Theory of operation.
9. A complete list of replacement parts, with part numbers.
10. The above noted shop drawings.

D. Submit specified test results.

E. Equipment Maintenance - The entire unit shall be guaranteed for a period of 1 year from the date of Final Acceptance. Include in the bid the cost of a preventive maintenance contract for the first year. Preventive maintenance contract shall include 2 diagnostic performance checks. One shall be performed after 6 months. The other before the guarantee period expires. Define the details of the preventative maintenance and performance checks with the bid.

1.6 SUMMARY

A. UPS units shall be required for both field devices as well as head end equipment. UPS shall be sized to supply backup power for a period of at least 1 hour.

B. Rate system for continuous full load service at the environmental, space, and electrical conditions of the site. Design UPS system for synchronized, parallel operation with the incoming AC supply so as to allow uninterruptible transfer from one source to the other. Construct system from manufacturer's standard components fully coordinated and tested to provide unattended operation.

C. This Section includes an on-line static UPS, including the following principal component parts:

1. Rectifier/Battery Charger
2. Battery
3. Inverter
4. Monitoring Circuitry
5. Static Bypass Transfer Switch
6. Internal Automatic Bypass
7. External Maintenance Bypass (An internal manual bypass may be provided but the external by-pass that shall completely isolate UPS for maintenance and removal, is still required).
8. Alarms, Metering and Indicators

D. Design UPS system for the electrical characteristics and environmental conditions indicated below. Submit detailed data for proposed equipment and clearly indicate deviations from specifications and drawings.

1.7 SYSTEM DESCRIPTION

A. Configuration: Factory-fabricated, in a single modular cabinet. Battery shall be housed in the cabinet. Automatic operational features include the following:

B. Electrical Characteristics:

1. Battery string voltage: 24Vdc

2. Input:

a. Nominal voltage: 120Vac

b. Nominal frequency: 60Hz

c. Current: 2.0A (@ nominal voltage and max battery charging current)

d. Voltage range: 85 to 150Vac

3. Output:

a. Voltage: 120Vac

b. Current: 0.83A @ 120Vac

c. Power at 50 degree Celsius (C): 100 W/VA Total

C. Communications Interface:

1. Ports:

a. USB-B Female: Local Communication

b. Optional RJ45: Remote Communication

2. Indicators - Green & Red LED's:

a. Solid Green: Line Mode

b. Flashing Green: Inverter Mode

c. Flashing Red: Alarm Solid Red: Fault

3. Dry Contacts: 2 x Programmable NO/NC (250Vac, 1A)

4. Factory Default:

a. C1: On Battery

b. C2: Low Battery

D. Mechanical:

1. Dimensions:

a. mm: 292 Height x 381 Width x 152 Depth

b. inches: 11.5 Height x 15 Width x 6 Depth

2. Weight (4 x 9Ah batteries): 20.4 kilogram (45 pounds)

E. Environmental:

1. Temperature: minus 40 to 50 degrees C (minus 40 to 122 degrees Fahrenheit (F)) (Requires heater mat at lower temperatures)

2. ROHS Compliance: Yes excluding batteries (Batteries exempt as per Directive 2006/66/EC)

3. Enclosure Rating: National Electrical Manufacturers Association (NEMA) 3R/IP53

F. Performance:

1. Typical output voltage THD: Less than 3 percent (inverter mode)

2. Typical efficiency: Greater than 96 percent (resistive load)

3. Typical transfer time: Less than 5ms

4. Run time (Using 4 x 9AH batteries at 25 degrees Celsius):

a. 20W - 6 hours

b. 50W - 3 hours 30 minutes

c. 70W - 2 hours 40 minutes

d. 100W - 2 hours

5. Agency Compliance:

a. Electrical safety: UL 1778, CSA C22.2 No. 107.3; IEC 62040-1

b. EMC: 47 CFR 15 Subpart B, Class A; CES-003 Class A; IEC 62040-2

## 1.8 SYSTEM OPERATION

A. Operational Performance:

1. Design UPS system to operate as follows:

a. Normal Conditions: Supply the load with power flowing from the normal AC power input terminals, through the rectifier/battery charger and inverter with the battery connected in parallel with the rectifier output.

b. Abnormal Supply Conditions: When the normal AC supply deviates from specified voltage, waveform, or frequency limits, the battery shall supply energy to maintain constant inverter output to the load.

c. When normal power fails, energy supplied by the battery through the inverter shall continue to supply the load without switching or disturbance.

d. When power is restored at the normal supply terminals of the system, the rectifier/battery charger shall supply power to the load through the inverter and simultaneously recharge the battery. The inverter shall be synchronized with the external source before load is transferred.

e. When the battery becomes discharged and normal supply is available, the battery shall be charged by the rectifier/charger. Upon reaching full charge, the rectifier/charger shall automatically shift to a float charge mode.

f. When any element of UPS system fails, and power is available at the normal supply terminals of the system, the static bypass transfer switch shall switch the load to the normal source.

g. If a fault requiring current in excess of the overload rating of UPS system occurs, the static bypass transfer switch shall operate to bypass the fault current to the bypass supply circuit of UPS system in order to provide sufficient fault clearing current for the downstream overcurrent devices.

h. Input and output circuits shall be equipped with circuit breakers containing shunt trips and/or with contactors so that the unit can be completely shutdown removing power to the unit when commanded to do so.

2. Prolonged AC Supply Failure: On a prolonged failure of the incoming AC supply, UPS shall automatically shut down at the end of the battery discharge period, and an alarm shall be given. When AC supply is restored, the unit shall start up, and the critical load shall be automatically connected directly to AC supply by the automatic bypass circuit, and the battery shall be automatically re-charged. The system shall be restored to normal operation under manual control.

3. Manual Control: Manual controls shall be provided for:

    a. Start/Stop of UPS system

    b. Transfer to/from the automatic bypass circuit

    c. Total isolation of the set and the associated control system for maintenance

    d. Emergency shut down of UPS system

    e. Alarm reset

    f. Menu driven commands

PART 2 - PRODUCTS

2.1 GENERAL ARRANGEMENT

A. Construct UPS system in a free standing, dead-front NEMA 3R, dependent upon mounting location, rigid metal enclosures, equipped with adequate hoisting, jacking, and rack mounting provisions. For outdoor UPS systems: UPS enclosure shall be weatherproof and shall be NEMA 3R type construction.

B. Outdoor UPS System: The cabinet shall be sealed and the front door shall have a gasket to firmly seal the system. It shall be NEMA 3R type construction.

C. Outdoor UPS System: Forced cooling shall be provided internally. Heat shall be dissipated through convection technology. A Gore Protective Vent System shall be used to ensure balanced battery gas conditions and internal and ambient temperature equilibrium. UPS batteries shall be rated for high temperature use.

D. Shock and Vibration: UPS shall be tested to Earthquake Zone 4 Standards.

E. Protect openings with suitable screens to prevent entry of rodents and insects. Clean metal surfaces, prime and finish with 2 coats of enamel paint. Design cabinets for front access controls. Mount main system instruments and indicators recessed on the front of the cabinet. Furnish with permanent component identifications, labels, and circuit diagrams. Design UPS cabinets for cable entry required and/or indicated on Drawings. Provide adequate wiring support and suitable barriers between power and control wiring. Where wiring passes from a cubicle to a hinged panel, protect by sleeving or using flexible conduit anchored at both ends. Furnish UPS system with internal power and control wiring connected and tested at the factory. Provide equipment with suitable grounding studs and links and ensure permanent and effective equipment grounding.

## 2.2 GENERAL DESIGN PARAMETERS

A. Protection

1. Provide UPS components with built-in self-protection against power line surges, under voltage and overcurrents introduced by the incoming AC supply, and types of internal failures within the system components which might cause damage to connected loads and equipment.

2. Protect UPS system input elements, rectifier/charger, inverter, controls, and output components against voltage transients with surge suppressors conforming to UL 1449, "Transient Voltage Surge Suppressors."

3. RF Limits - The manufacturer shall show that RF radiation of the units is less than 20 db Mv/M/MHz three feet in any direction from the module over the range of 100 KHZ to 2 GHZ. Previous tests of identical units shall be satisfactory evidence of compliance.

4. Ventilation - Adequate cabinet ventilation shall be provided to insure that components are operated within their environmental ratings. An integral thermal system shall be designed into the uninterruptible power unit so that dissipated heat can be removed as efficiently as possible and with minimum heating of air and parts near heat sources. Local (hot spot) temperature rise shall be minimized by careful placement of parts. Air shall enter the bottom of the cabinets and exhausted at the top. Blower motors shall be redundant. Blower unit failure shall be indicated as a visual and audible alarm on the alarm panel. Provide air filtering.

5. Noise Level - Noise generated by UPS, under any condition of operation, shall not exceed a noise criteria of NC55.

6. Parts and Materials - Materials and parts comprising UPS shall be new, of current manufacturer, of a high grade, and free from defects and imperfections and shall not have been in prior service except as required during factory testing.

7. Components - Active electronic devices shall be solid state. Semi-conductor devices shall be hermetically sealed.

8. Terminals - Terminals and lugs shall be supplied for making power connections and remote alarms specified herein and shall be marked so as to match schematic designations.

9. Semi-Conductor Fusing - Power semi-conductors shall be protected by current- limiting fuses in a manner to prevent cascaded or sequential semi-conductor failures.

10. Instrumentation and Controls - Control Cabinet

B. Equip UPS system with the following minimum graphical performance data, metering, instruments, control devices, and LED status/alarm indicators and history (or LCD display) as a minimum. Alarm conditions shall also sound a silenceable audible.

C. Metering:

1. Input AC volts

2. Output AC volts

3. Output AC amps

4. Output frequency

5. Status Indicators

6. Battery status

D. Alarm and indications:

1. Fan failure alarm

2. Input circuit breaker tripped alarm

3. Inverter fuse blown alarm

4. Inverter over temperature alarm

5. Inverter power supply fault alarm
6. Battery charge failure alarm
7. Prolonged discharge shutdown alarm
8. Inverter output overvoltage or undervoltage alarm
9. UPS overload shutdown alarm
10. Normal operating status
11. Reset of alarms
12. Battery mode indication
13. Bypass mode indication
14. Battery health information
15. Battery test circuit
16. Master NO alarm contact that shall operate when any of the above alarm conditions are actuated, rated 120 volts for external use.
17. Provide additional NO contact that shall operate when the unit detects failure of incoming power to the unit.

E. Controls: Include the following:

1. Inverter on-off
2. UPS start/stop
3. To/from bypass
4. Total isolation
5. Alarm reset
6. Menu use
7. Emergency shutdown

F. Alarm silence/reset: Labeled LEDs or LCD display shall indicate conditions listed above. Audible signal shall sound for alarm conditions indication. Silencing switch shall silence signal without altering visual indication.

G. Remote Annunciation provisions: Equip UPS system with internal circuitry and electronics and wiring, including an RJ- 45 type data jack to connect to the TCP/IP Ethernet network. At a minimum, UPS shall be able to utilize RMON.

H. Rectifier: Provide full-wave solid state rectifier capable of continuously delivering the rated DC power requirement of the inverter and recharging the battery within 3 hours. Protect rectifier's circuit with an AC input circuit breaker equipped with undervoltage trip to open the circuit when the AC source voltage drops below specified limits. Circuit breaker to be rated at a minimum of 22 KAIC symmetrical. Provide circuit with input filter to limit harmonics to line system as previously described. Ferris describe in conformance with IEEE 519. Construct rectifier circuit to withstand normal input power surges, fluctuations, and single phasing conditions.

1. DC bus of the rectifier shall not rely upon the battery string for ripple filtering.

2. DC Circuit protection: Provide a DC circuit breaker, UL listed for the specific purpose in DC circuit between the rectifier and the battery with sufficient poles to protect DC conductors between the rectifier and the battery.

I. Battery:

1. Four 9Ah type batteries per unit

2. Provide valve regulated, sealed lead acid battery(ies) with voltage, and capacity providing the proper inverter output for the batteries to serve the full load output at 0.8 PF for a period not to be less than 1 hour. Batteries used in outdoor environments shall be rated for high temperature use.

3. Float voltage shall not exceed 2.26 volts per cell and final discharge voltage shall not be less than 1.7 volts per cell.

4. Provide a battery circuit breaker disconnect that shall allow the battery to be disconnected from UPS in emergency, for a shutdown or for any other safety condition.

J. Inverter:

1. Provide solid state DC to AC 1-phase or 3-phase inverter utilizing electronic circuitry, capable of operating from the rectifier's output, or the battery supply over a full battery terminal voltage range. Set unit to discontinue operation when the battery voltage falls below the final voltage.

2. Internal Bypass Switch: Provide solid state internal bypass switch, of electrical ratings and characteristics indicated, with sensing and automatic transfer circuits that cause automatic

3. Uninterrupted transfer of the load to the bypass AC line upon sensing overload or fault conditions in UPS, without exceeding the specified transient limits. Rate static switch to supply more than the full load current as a minimum. Provide static switch with circuit breaker or contactor which shall automatically close and remove the static switch from the power flow after load is transferred to the bypass line, thus minimizing losses in the static switch.

4. Regulation: Plus or minus 1 percent, 0 to 100 percent load

5. Efficiency: 98 percent at rated load

6. Transfer Characteristics:

7. Transfer time: Less than 1/4 cycle

8. Maintenance Bypass Isolation: Provide a maintenance isolation bypass switch so that the entire UPS can be completely electrically isolated for maintenance. No component or conductor within UPS module shall remain energized when the load is being fed from the maintenance isolation bypass switch. The maintenance isolation bypass switch shall allow uninterrupted transfer of the critical load from UPS output to the bypass source and transfer from the bypass source to UPS output. Provide and interlocking means to prevent paralleling the inverter output with the bypass source through the maintenance isolation bypass switch when the sources are out of phase.

K. Manufacturers:

1. Subject to compliance with requirements, provide products by the following:

a. American Power Conversion (APC) – for indoor, controlled environment only.

b. Alpha Technologies

c. Energy Technologies, Inc.

d. Liebert

e. Falcon Electric, Inc.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. UPS shall be tested for acceptable performance and for compliance with other applicable requirements of this technical specification, and of Contract. Give Engineer advance notice of his intended time of performance of the tests. The right is reserved for a representative of Department to witness tests. Personnel, equipment, devices, and accessories necessary for conducting the tests shall be provided.

2. In-Plant Tests - Tests shall be conducted by the manufacturer at his plant on the assembled UPS, complete with battery operation. Upon satisfactory completion of the tests, UPS so tested shall be approved for shipment. Failure to meet any of the tests specified in the approval test plans shall be cause for rejection of UPS. Noted testing may be done with prototype units using same components as the project specific unit. Submit in-plant testing results.

3. Harmonics (In-Plant Test) - The total harmonic content of UPS input and output voltage wave shall be determined for each load specified herein before by a harmonic analyzer in conformance with the manufacturer's written instructions.

4. Rectifier and Charger Input Current Limiting (In-Plant Test) - with UPS operating from the primary AC source the rectifier load shall be increased. The input current of each phase shall be measured to determine if the rectifier/charger input current limiting devices function as specified.

5. Current In-Rush (In-Plant Test) - with UPS operating from the battery supply, UPS shall be returned to the primary AC source. The input current shall be measured with a strap chart recorder to determine if the current in-rush/walk-in feature is functioning as specified.

6. Power Factor (In-Plant Test) - with UPS operating from the primary AC source at full-rated load, the input power factor shall be measured.

7. Voltage and Frequency Adjustment (In-Plant & Acceptance Test) - It shall be ascertained that voltage and frequency setting devices are functioning and cover the range specified herein before.

8. Electromagnetic Interference Measurements (In-Plant) - Tests shall be conducted at the manufacturer's plant to determine compliance with requirements for interference suppression in conformance with the specifications. Tests shall not be required for UPS that are physically and electrically identical to those that have previously met this requirement and for which copies of test reports and certification are submitted.

9. Acoustical Noise Level Test (In-Plant Test) - with UPS operating from the primary AC power sources, measurements of sound pressure levels shall be made so that the overall sound pressure level and the sound pressure levels in the 8 octave bands shall be recorded. Ambient background noise levels shall be at least 10 dB below the octave band sound pressure levels produced by UPS. Noise measurements shall be made at a level, unobstructed site with instrumentation consisting of a sound level meter in conjunction with an octave band analyzer. The flat frequency response of the sound level meter shall be used in making measurements. With the microphone of the measuring equipment located at a distance of 6 feet from the surface of UPS cabinet, measurements shall be taken successively at 12 different test locations. Test location points shall be spaced 30 degrees apart in the horizontal plane. Tests shall not be required for UPS that are physically and electrically identical to those that have previously met this requirement and for which copies of test reports and certification are submitted.

10. Load Test (in plant):

    a. UPS module shall be tested at full load for 2 hours. Follow with 4 minutes utility outage during which the unit shall operate on battery power. Then follow by utility power for at least 2 hours but with enough time to fully recharge the batteries.

b. Instrumentation - The following information shall be recorded in the plant system load test:

1) AC input power

2) AC input voltage

3) AC input frequency

4) AC output voltage

5) AC output frequency

6) AC output current

7) AC input current

8) Inverter input DC voltage

9) Inverter input DC current

10) Load power factor

11) Harmonic content

11. Inspection for Workmanship - UPS to be delivered shall be submitted to a thorough check of dimensions, methods of assembly, and workmanship before shipment.

12. Acceptance Tests - Perform standard manufacturer start up testing and in addition:

a. UPS shall be tested at full load, using load banks and cables supplied by Contractor or the testing organization. Engage the services of an independent testing company to perform these field acceptance tests. The manufacturer shall provide assistance to the testing company and shall be present for these tests. Each unit is to be:

b. Run on utility power for 3 hours at full load followed by 1/4 of the rated duration in minutes of battery power, then 1 hour on utility power. Allow unit to recharge fully.

c. It shall be certified that voltage, current and frequency for AC input, AC output, and DC parameters are functioning and cover the range specified herein before.

d. A letter of certification from the testing company shall be required stating that the tests have been performed along with a copy of the test results. Record parameters in 5 minute intervals and at least twice when the load is being served by the batteries.

13. Training - UPS manufacturer shall provide a minimum of a 4 hour training instruction course at site covering operation, theory of maintenance procedures, hands-on instructions, and complete review of maintenance and operation manuals. Training course time and location shall be coordinated with Department at least 10 days in advance.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Installation and documentation of equipment for a Digital Video Recording and Management System (DVRMS). Section includes:

1. Programming the systems is part of Contract and shall include but is not limited to camera and alarm titles, virtual matrix functionality, operator permissions and equipment addressing.

2. Testing is part of Contract and shall include but not be limited to provisions contained in Testing Article of this Section.

3. Operator training is part of Contract and shall include but not be limited to provisions contained in Training Article of this document.

4. Integration with the Intelligent Video Processor System shall be required as a part of Contract. DVRMS shall be able to tag video and change recording rates based on Intelligent Video Processing System (IVPS) alarm events. Also, the alarm recordings shall be retrievable via DVRMS based on the alarm event tag.

5. The ability to integrate with a future access control system for alarm event recording is required. Include software interfaces, APIs, and documentation required to coordinate and develop this integration.

## 1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 05 34 - Outlet, Junction, and Pull Boxes

C. Section 27 13 23 - Communications Optical Fiber Backbone Cabling

D. Section 28 05 07.23 - Uninterruptible Power Supply

E. Section 28 20 00 - Video Surveillance

F. Section 28 31 22 - Electronic Safety Alert

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work in this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. 47 CFR 15 - Radio Frequency Devices.

B. NFPA 70 - National Electrical Code.

1.5 ACRONYMS

| | |
|---|---|
| AGC | Automatic Gain Control |
| API | Applications Programming Interface |
| API/SDK | Application Programming Interface/Software Development Kit |
| ARP | Address Resolution Protocol |
| AWB | Automatic White Balance |
| BLC | Back Light Compensation |
| CBR | Constant Bit Rate |
| CCD | Charge Coupled Device |
| CSM | Client Software Modules |
| CVBR | Constant and Variable Bit Rate |
| DHCP | Dynamic Host Configuration Protocol |
| DNR | Digital Noise Reduction |
| DNS | Domain Name Server |
| DVRMS | Digital Video Recording & Management System |
| EAP | Extensible Authentication Protocol |
| EO/IR | Electro-Optical/Infrared |
| FOC | Fiber Optic Cable |
| fps | frames per second |
| FTP | File Transfer Protocol |
| GUI | Graphical User Interface |
| HTTP | Hypertext Transfer Protocol |
| HTTPS | Secure Hypertext Transfer Protocol |
| ICMP | Internet Control Message Protocol |
| IGMP | Internet Group Management Protocol |
| IP | Internet Protocol |
| IR | Infrared |
| IVA | Intelligent Video Analytics |
| JPEG | Joint Photographic Experts Group |
| LAN/WAN | Local Area Network/Wide Area Network |
| LDAP | Lightweight Directory Access Protocol |

| | |
|---|---|
| MJPEG | Motion JPEG |
| MM | Multi-mode Fiber Optic Cable |
| MPEG | Moving Pictures Experts Group |
| NTP | Network Transfer/Time Protocol |
| NTSC | National Television System Committee |
| NVR | Network Video Recorder |
| PoE | Power over Ethernet |
| PPPoE | Point-to-Point Protocol over Ethernet |
| PTZ | Pan, Tilt, Zoom |
| QoS | Quality of Service |
| RTP | Real-Time Transport Protocol |
| RTSP | Real-Time Streaming Protocol |
| SM | Single Mode Fiber Optic Cable |
| SMTP | Simple Mail Transfer Protocol |
| SNMP | Simple Network Management Protocol |
| SSH | Secure Shell |
| SSL | Secure Sockets Layer |
| SSM | Server Software Modules |
| TCP | Transmission Control Protocol |
| TCP/IP | Transmission Control Protocol/Internet Protocol |
| TWIC | Transportation Workers Identification Card |
| UDP | User Datagram Protocol |
| UPnP | Universal Plug and Play |
| VBR | Variable Bit Rate |
| VMS | Video Management System |
| WDR | Wide Dynamic Range |

1.6 SEQUENCING AND SCHEDULING

A. Coordination: Coordinate with other Work, including electrical wiring Work, as necessary to interface installation of DVRMS with IVPS installation and the Video Surveillance System.

B. Sequencing: Sequence DVRMS installation Work with other Work to minimize possibility of damage and soiling system during remainder of construction period.

1.7 SUBMITTALS

A. General: Partial submittals are not acceptable. Submit documents in conformance with Conditions of Contract including but not limited to:

1. Construction Progress Documentation for a list of submittals and schedule requirements

2. Project Management and Coordination

3. Project Record Documents

4. Closeout Procedures

5. Operation and Maintenance Data

B. Informational Data: Submit the following documents in conformance with conditions of Contract:

1. Construction Schedule in conformance with Construction Progress Documentation

2. Contractor Qualification Data demonstrating capabilities and experience of the firm. Include lists of completed projects with information on project name and address, name and addresses of architects, consultants or owners involved in these projects

3. Installer Certifications on manufacturer’s letterhead indicating that installer complies with the manufacturer’s requirements necessary to install the equipment specific to Project.

C. Product Data: Submit manufacturer's data on digital video recording and management system components as follows:

1. Electrical specifications

2. Mechanical specifications

3. Instructions for installation, operation

4. Maintenance manuals

5. On data sheets that illustrate multiple models, the particular model proposed for the application shall be highlighted, encircled or otherwise identified. Individual copies shall be included for each proposed model number indicating areas of application.

6. Deviations from specifications shall be highlighted, encircled, or identified on the documents and be marked as deviations.

D. Shop Drawings:

1. Product Data: Submit manufacturer's data on DVRMS System components including, but not limited to, electrical specifications, mechanical specifications, roughing-in diagrams and instructions for installation, operation and maintenance, suitable for inclusion in maintenance manuals.

2. Shop Drawings: Provide Shop Drawings showing equipment locations and arrangements.

3. Functional Block Diagram: Provide overall block diagrams showing the major interconnections between components. Every addressable device shall be identified and every required port shown.

4. Assembly Drawings: Provide Assembly Drawings with location and dimensions shown.

5. Show the proposed method of cable routing.

E. Operation and Maintenance Manuals:

1. The intent of this requirement is to allow Department’s maintenance staff to repair equipment failures without adversely affecting the manufacturers' warranty.

2. This Section requires complete documentation of DVRMS System for the purpose of system operation and maintenance during and after the warranty period. It is intended that the operation and maintenance manuals be exhaustive in the coverage of the system to the extent that they may be used as the sole guide to the troubleshooting, identification and repair of defective parts. This data shall be specific to the installation at Department. This data shall be provided in conformance with Training Article of this Section.

3. The maintenance manual requirement of this Section is in addition to shop drawing requirements. Maintenance manuals and drawing sets shall be compiled after system fabrication and testing, and shall incorporate changes made after shop drawing submittal. The maintenance manuals and drawing books shall be permanently bound in hard covers. Provide manufacturer's standard literature, for equipment included in the system. The maintenance manuals shall contain specifications, adjustment procedures, circuit schematics, component location diagrams, and replacement parts schedules.

4. Provide 3 complete hard copies and 1 electronic copies in PDF format drawing books and maintenance and operation manuals on the completed system. These manuals shall include basic wiring diagrams, schematics, and functional details such that going to the actual equipment and making reference to this manual may easily identify any component, wire, or piece of equipment in the system. It is required that everything in the system be neatly labeled and easily identifiable. Every terminal, wire, fiber, component, or piece of equipment, and other such items shall have a number or letter designation. Identification characteristics shall be included in the maintenance and operation manuals. Contractor shall provide 1 set of Drawings as reproducible, and where Drawings are CAD generated, provide 2 sets of the drawing files in machine-readable AutoCAD 2007 or newer. Provide 2 sets of schedules and tables in PDF format.

5. Drawing Books: Drawings developed specifically for Project shall be reduced to 11 by 17-inch, folded and bound with hard plastic covers. Drawings shall be easily readable after reduction, even if this requires Drawings to be broken into multiple sheets. Under no circumstances shall text be smaller than 1/16-inch after reduction. Provide component identification and cross reference on Drawings to allow the Construction & Maintenance Division to understand the function of each item (the block diagram), find the room where the device is mounted (Contract Document plans), find its location in a rack (arrangement drawings), find how it is wired (wiring diagrams), and its detailed specifications (vendor data sheets), and how to repair it (spare part lists). Include the following Drawings as a minimum:

    a. Functional Block Diagram: Provide an overall block diagrams showing the major interconnections between subsystems components.

b. Arrangement Drawings: Provide Drawings showing the physical arrangement of major system components.

c. Elevation Drawings: Provide Elevation Drawings of equipment racks showing the location of each component in the racks. Components in the racks shall be identified as in the functional block diagrams. Drawing shall show the routes of cables connecting its components.

d. Wiring Diagrams: Provide wiring diagrams showing interconnecting wiring. Wire identification on the diagrams shall agree with the wire markers installed on the equipment.

e. Spare Parts Lists: Submit cost lists of manufacturers recommended spare parts to maintain the complete DVRMS, with a minimum of down time. This list shall include part names, part numbers, and source(s) for additional purchase. The parts list shall be cross-referenced to the functional block diagrams and the product data.

f. Special Tools List: Submit a list of special tools required to maintain DVRMS. Include on the list the name, part number, and source for special tools.

g. Special Test Equipment List: Submit a list of special test equipment required to prove that components of the system are functioning per specification.

1.8 INTELLECTUAL PROPERTY

A. Patents: Should patented articles, methods, materials apparatus, and the like, be used in this Work, Contractor shall acquire the right to use the same. Contractor shall hold Department and its agents harmless for any delay, action, suit, or cost growing out of the patent rights for any device on this Project.

B. Copyrights: Should copyrighted software be used in this Work, Contractor shall acquire the right to use the same. Contractor shall hold Department and it’s agents harmless for any delay, action, suit, or cost growing out of the copyrights for any software on Project.

C. License to Use: Software required for the complete operation of the system as specified in this Section shall be delivered with either full ownership transferred to Department or a license to use at this Project Site, including the right to make back up copies.

1.9 RADIO/TELEVISION INTERFERENCE

A. Federal Communications Commission (FCC) Compliance: Equipment that uses radio frequency energy shall be certified to comply with Subpart J of 47 CFR 15 as those rules define a class A computing device.

B. Expected RF Environment: This DVRMS is to be installed in a port located adjacent to a Metropolitan area, which is subject to background RF levels expected in such an area. It is Contractor's responsibility to protect the systems specified here from interference of other systems, and through FCC compliance listed above, to prevent interference with other systems.

1.10 QUALITY ASSURANCE

A. Conform to requirements of any and standards of workmanship.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience and with service facilities within 500 miles of Project.

1. A minimum of 2 fully operational and commissioned sites are required utilizing the same version of hardware and software proposed for this facility.

2. Contractor shall provide references for sites required by Paragraph B of this Article including facility name, types of hardware and software installed, commissioning date, and facility contact person.

C. Verification of reference systems operation is a requirement for award.

D. Key Personnel Qualifications: Authorized installer of specified manufacturer with service facilities within 500 miles of Project.

1. Key personnel shall possess at least 2 years of successful installation experience with projects utilizing High Definition IP Base CCTV systems, Image Stabilization, Video Systems, LAN/WAN, integration with existing systems, and wireless Work similar to that required for Project.

2. Key Personnel including Project Manager, Project Engineer, and Lead Installer shall provide information as to project experience.

E. Products: Furnish products listed and classified by Underwriters Laboratories Inc. (UL), Tories Inc., or International Organizations for Standardization (ISO), as suitable for purpose specified and indicated.

1.11 QUALIFICATIONS

A. Manufacturer shall have a minimum of 7 years of experience in producing IP video equipment.

B. Installers shall be trained and authorized by the manufacturer to install, integrate, test, and commission the system.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver DVRMS components properly packaged in factory-fabricated type containers. Enclose an operating impact sensor in each container that is holding sensitive electronic equipment. The impact sensor shall be capable of recording a 5G rating.

1. Handling: Handle DVRMS equipment and components carefully to avoid breakage, impact, denting and scoring finishes. Do not install damaged equipment. Replace and return damaged units to equipment manufacturer.

B. Deliver the equipment in the manufacturer’s original, unopened, undamaged container with identification labels intact.

C. Store the equipment in a temperature environment protected from mechanical and environmental conditions as designated by the manufacturer.

1.13 WARRANTY

A. Period: Warrant labor, workmanship, and materials for a period of 2 years from the date of Final Acceptance. Should a failure occur within the first 2 years of the system, Provide labor and materials necessary to restore the system to the condition required for the Final Test and Acceptance for Contract, at no cost to Department.

B. Offer an “Optional 1 Year Extended Warranty” package renewable for up to 3 years to Department. Engineer shall inform Contractor of the acceptance or rejection of the first year of the package prior to the expiration of the warranty period as noted above. Provide a price for each year individually and this shall be available to Department. Notify Engineer in writing 2 months prior to warranty expiration to determine the status of the optional one year warranty.

C. Response Times: For the Warranty Period, Extended warranty Periods as applicable, and for the Operations Maintenance Service Agreement durations, the following response times shall be maintained:

1. The initial call to Contractor shall require the type of call to be classified as critical or non-critical. The nature of the problem and the effect on Department operations shall be the deciding factor in classifying the problem. For the purpose of defining the priority of the call, Contractor shall have personnel accessible to Department personnel via phone call-back within 1 hour of initial call.

2. Non-critical Items: For purposes of this Section, these are defined as failures or problems which do not affect the overall safety, security, or operation of Department.

3. Critical Items: For purposes of this Section, these are defined as failures or problems, which do affect the overall safety, security, or operation of Department including those items requiring an immediate remedy to restore Department security.

4. Non-critical items: Contractor shall diagnose and remedy the problem during normal working hours of the next working day. The initial response shall be the morning of the next day if received before noon or by the noon the next day if received before close of business. Normal business hours are defined as 8 AM to 5 PM Monday through Friday.

5. Critical Items: Critical Items require Contractor to respond with due speed. Contractor shall be on-site within 8 hours of the initial call. These calls shall possibly need to be responded to outside of normal business hours.

D. Tie-ins: DVRMS may be expanded during the warranty period. Additional cameras, which may or may not be provided by Contractor, may be connected to the system and some cameras may be removed. The connection of new cameras or the removal of existing cameras shall not void this Warranty.

## PART 2 - PRODUCTS

### 2.1 GENERAL

A. Provide material of types, sizes, capacities, and electrical characteristics indicated. Except as otherwise indicated on Drawings, provide manufacturer's standard DVRMS components as indicated by published product information, designed and constructed as recommended by manufacturer.

B. Power Supply: Devices in DVRMS shall operate on no more than 120 VAC primary input power, except where noted or authorized by Engineer. Any special power treatment required such as filtering or spike elimination that may be required for proper operation of DVRMS shall be provided with the system.

C. Provide uninterruptible power supply meeting specification to supply a minimum of 4 hours of battery operation upon primary power failure.

2.2 DESCRIPTION

A. DVRMS shall be a rack-mountable unit that allows the recording, live viewing, and playback of recorded video for periods of a minimum of 28 days without the need for offline storage. On-line storage shall be calculated to permit recording of 200 real-time alarm events with each event having duration of 5 minutes in addition to the continuous recording of non-alarm cameras at a frame rate of not less than 7.5 National Television System Committee (NTSC) frames per second for 28 days without being overwritten. At a minimum, DVRMS shall be capable of recording inputs at a minimum of 7.5 fps simultaneously.

B. DVRMS shall perform viewing, playback, and video storage functions simultaneously.

C. DVRMS shall be a PC-based video processor and recorder. Video shall be displayed on a standard LCD monitor, and configuration shall be performed with a standard mouse and keyboard. DVRMS shall have the ability to display full-frame, real-time video on VGA, HDMI, and LCD video monitors.

D. DVRMS shall be configured using an interface application and shall record video continuously, only during alarm events, or only while activity is present.

E. Each camera shall be able to record in different compression formats, frame rates, activity modes, and on different schedules or by using the same schedule and configuration.

F. Local and remote interfaces shall allow easy search and retrieval of video. User-defined parameters shall allow searches based on the time and date the video was captured; whether alarm, motion, or scene loss events occurred; and which camera captured the video.

G. The interfaces shall also permit full video storage management, hardware control, alarm configuration, and export of video and individual frames.

H. Remote connections shall be available over standard TCP/IP network.

2.3 DVRMS PERFORMANCE SPECIFICATIONS

A. DVRMS shall be a rack-mountable, IP video security appliance capable of 1000BaseT Gigabit network communication. DVRMS network shall be configured so that each section of Department Complex operates independently and communicates to DVRMS System Manager through no less than a 1000BaseT Gigabit Network.

B. It shall accommodate viewing, recording, and video intrusion monitoring for cameras specified on Drawings.

C. DVRMS System Manager software shall allow for the restriction of users to logical, configurable groups of cameras, monitors, and system operations and configuration.

D. DVRMS System Manager shall be capable of incorporating RSA 256 bit public/private key authentication, in addition to custom bit public/private key authentication.

E. DVRMS System Manager shall manage rights and permissions for associated devices, personnel, and any system video or other data.

F. DVRMS digital recording and monitoring system shall incorporate a fault tolerant architecture and shall include redundancy provisions for DVRMS power supplies and hard disk storage drives. Network Video Recording Storage appliances shall provide hot swappable power supplies and hot swappable hard disk arrays.

G. DVRMS shall provide RS-232, RS-485, or RS-422 communications providing the ability to control compatible pan/tilt/zoom (PTZ) devices from various manufacturers.

H. Digital video signals from the cameras shall be compressed and stored on a local hard disk or hard drive array in a First In First Out method overwriting the oldest files when the storage device becomes full. The system shall be able to archive forensic video clips to an internal DVD-R disk drive, USB flash drive, and archive video to a RAID 5 hard disk array, and/or NAS configuration.

I. DVRMS shall record 30 NTSC frames per second from a camera when the IVPS has an alarm signal from an area associated with that camera.

J. DVRMS shall use high-resolution compression with a minimum resolution of 4 CIF and record at no less than 7.5 NTSC frames per second on cameras not in alarm recording mode. It shall be able to support MJPEG, H.264, MPEG4 formats and have the capability to support Megapixel camera technology. Archived video shall have a unique watermark for forensic authentication purposes.

K. DVRMS shall provide a network interface for remote viewing, playback, configuration, and alarm management operations. The system shall have the capability to be equipped with a modem.

L. Each network video recorder and management system camera input unit shall contain an r DVD-R drive and USB 2.0/3.0 ports.

M. Each video monitor onscreen display shall identify camera names of up to 48 characters in length. The onscreen display shall have the option to be displayed or hidden as part of the camera view.

N. The system shall be capable of broadcasting emails designated recipient(s) upon the occurrence of user-selected events or actions such as alarm events, video signal loss, scene loss, and recording stoppages. It shall be possible to send images from these events to a web enabled Smartphone or PDA, as an included option.

O. DVRMS shall automatically perform a backup of important configuration data such as schedules, camera settings, IVPS settings, and server settings in an executable file. This configuration file shall be saved on a backup DVD-R, CDR, NAS, RAID, or mirrored to a Department specified network drive.

P. Video Data shall be archived to any storage device accessible over a network connection. Archiving shall be controlled through DVRMS configuration interface. Archiving shall have the option to be activated manually or automatically. Manual archiving shall store data captured between selected dates and times. Automatic archiving shall store data captured between the time the option is selected and the time entered on the configuration interface. Archived video shall be played back directly from the storage device using remote client playback software. Archiving actions shall be logged. Recording shall continue during archiving. Archived data shall remain on the local disk or disk drive array until replaced by newer data when the disk threshold is reached.

Q. Un-archived video data shall be protected by selecting an option on the configuration interface. If an archive medium has reached its capacity, the user shall be notified before archiving continues.

R. A hardware and software watchdog shall reset the system upon unauthorized actions or system failures. This watchdog circuit shall also include an additional, normally closed alarm output connected to an alarm input that could be monitored by Security personnel.

S. DVRMS System Manager shall be capable of performing as a NTP Server for the entire system. The IP Video Surveillance System shall be synchronized to the NTP Server so that system components function on the same clock and time zone corrections and time adjustments shall automatically be provided in the system.

T. DVRMS shall provide multilevel diagnostics of each system component in critical areas and reported to a diagnostic console for reporting purposes.

U. DVRMS shall be capable of future expansion of an unlimited total capacity from what is reflected on Drawings, including but not limited to the system cameras, monitors, alarm input circuits, and dry contact relay closures.

V. DVRMS shall be an integrated hardware and software platform that provides distributed administration of multiple devices and administration rights and privileges for attached devices.

W. DVRMS System Manager shall store a database of system errors, alarms, and other system events. The database shall be accessed and searched through the system software log window.

2.4 OPERATOR CONTROLS

A. The application interface shall function on a Windows or Linux operating system. It shall run automatically when DVRMS is powered up. The application shall require for the user to login to the network using a user name and password in order to access the application.

B. The application interface shall be accessible by entering an administrator-assigned username and password. DVRMS shall provide controlled permissions access to the system database and permit the database password to be changed.

C. Several user actions performed in the application shall be logged. These include starting and exiting the application; starting and stopping recording; stopping recording due to error; successful and unsuccessful login; system reboot; and video loss and video restore.

D. Another log shall include DVRMS operating system and other system errors.

E. DVRMS software interface shall provide built-in digital video virtual matrix switching capabilities that consist of live video windows in multiple configurations such as: 1 by 1, 2 by 2, 3 by 3, or 4 by 4, and PIP. It shall support the ability to switch any camera in the system to any type of monitor in the system, through the use of a keyboard/mouse configuration or a separate joystick controller.

F. A preset tour of camera combinations shall be accessible through a button on the interface. This tour shall cycle at a selectable speed.

G. PTZ cameras shall be controllable locally and remotely, with the capability to define and call presets; control pan, zoom, focus, and iris settings; and call cameras and presets on alarm.

H. Privileges to view video and control PTZ functions on specific cameras shall be assigned on user by-user basis in the configuration interface.

I. Cameras manually displayed in video windows shall be selected through buttons identified by camera number. Any combination and numbers of cameras shall be displayed simultaneously.

J. Graphical indicators shall alert the user to the type of recording occurring on any camera input. Displayed video windows shall clearly indicate the recording status. The recording status for cameras shall be indicated by a permanent graphic on a status bar.

K. Graphical indicators shall alert the user to video signal loss or loss of scene on any camera during recording.

L. A status bar shall display information about the current date and time and the status of the storage disk. The status bar shall provide access to a log file, plug-in applications, and a means of terminating remote connections.

M. A configuration interface shall be accessible through a button on the local and remote interfaces.

N. Video characteristics such as brightness, contrast, saturation, and sharpness shall be selectable for individual cameras.

O. The quality of captured or recorded video shall be selectable on an individual-camera basis at sizes of low, medium, high, and extra high. Image quality shall be selectable and be automatically switched to extra high during an alarm event.

P. The frame rate shall be selectable for individual cameras, including the choice of the maximum rate calculated using the number of connected cameras. Frame rates shall be automatically switched to 30 NTSC frames of video during an alarm event.

Q. Cameras shall be scanned and recognized upon the startup of the interface. Cameras added after startup shall be scanned through a button on the configuration interface. Automatic scanning for connected cameras during startup shall have the option of being disabled at the configuration interface.

R. Video camera titling shall provide for 100 alphanumeric characters in a field on the configuration interface which shall be used for camera description, site description, display time/date, site messages, defining screen block positions for titles, and the text display color. Each display feature shall have the capability to be toggled on/off through the System Manager.

S. Disk usage shall be set using the configuration interface. Disks used to store recorded video data shall be selectable from a list. Maximum disk capacity (percent) shall be adjustable. Current disk capacity shall be indicated by a bar graph.

T. Data shall be purged, based on date, through a button on the configuration interface. Automatic daily purging shall also be configurable.

U. The oldest data stored to disk shall be written over when disk capacity is reached and new video is recorded.

V. Access to configure the system shall require an administrator-assigned username and password. The system shall have the capability of assigning individual login rights with associated access privileges. Usernames and password shall be created using alphanumeric characters. Users can be assigned one of four permission levels, ranging from full access to interface to no access to interface.

W. Privileges to view live video, search for recorded video, and control PTZ functions on specific cameras shall be assigned on user-by-user basis in the configuration interface.

X. Access to the operating system, associated menus, standard file management applications, the settings control utility, additional installed applications and the ability to shut down the operating system shall be restricted in the configuration interface.

Y. All activities performed on the configuration interface shall be logged, and the log shall be available directly from the interface. Activities shall be sorted by user or date/time.

2.5 ALARM OPERATION

A. Alarms shall be named by typing up to 32 alphanumeric characters in a field on the configuration interface.

B. The normally open alarm output shall be triggered upon the occurrence of user-selected events or actions such as alarm events, video signal loss, scene loss, and recording stoppages.

C. Up to 16 TTL hardwired alarm inputs shall be available. Hardwired alarm inputs shall be definable as normally open or normally closed.

D. Up to 16 dry contact relay alarm outputs shall be configurable to trigger when motion events occur for a specified number of consecutive images during specified time ranges or on other types of system errors.

E. Pre-alarm and post-alarm recording shall be configurable for individual cameras.

F. Up to 4 cameras shall be assignable to record upon the occurrence of a single alarm event.

G. Maximum duration of alarm recording shall be set by selecting an option on the configuration interface.

H. Recording upon alarm trigger shall be scheduled for times or specific times either on the configuration interface or the scheduling interface.

I. Cameras shall be assigned output priority levels as an option on the configuration interface. In the case of simultaneous alarm or activity events on multiple camera inputs, the input with the highest priority level shall be displayed until the alarm or activity ceases.

2.6 PHYSICAL AND ELECTRICAL CHARACTERISTICS

A. DVRMS shall fit into a standard 19-inch rack. The case material shall be steel. Exterior edges must be broken and deburred to a uniform curve and smoothness.

B. The case color shall be matte black on the front and rear panels. The case color shall be textured black matte on the upper surface and sides to resist fingerprints.

C. Front panel power and reset switches shall have a tactile response (click) and a minimum operating life of 100,000 cycles when operating at a maximum rate of 2 cycles per second. The buttons shall be accessible through pinholes on the front panel.

1. 115VAC, 50/60Hz

D. Environmental Requirements:

1. Temperature: 41to 104 degrees Fahrenheit (F)

2. Humidity: 95 percent RH non-condensing

3. Altitude (operating): 0 to 10,000 feet

4. Tilt: Maximum of 15 degrees

2.7 BASIC EQUIPMENT CAPABILITIES

A. List of pertinent conceptual layout drawings (separate documentation).

PART 3 - EXECUTION

3.1 GENERAL

A. Investigate Project Site and become thoroughly familiar with the facility.

B. Plan DVRMS system installation such that DVRMS is installed and tested for proper operation in coordination with IVPS and Video Surveillance System.

C. Install DVRMS in conformance with equipment manufacturer's written instructions and complying with applicable security and electrical industry standards for installation.

D. Installation of conductors shall meet applicable manufacturer’s recommendations, local, city and national codes.

E. Install electrical permanent identification labels on conduits, junction boxes, conductors, and termination blocks.

F. Pair shields shall be grounded at 1 point only. Cables that originate from system head-end equipment and serve field devices shall be grounded to the signal ground terminal in the processing equipment.

G. Touch-Up Work: Touch-up scratched and marred surfaces to match original finishes; remove dirt and construction debris.

3.2 TESTING

A. Test DVRMS including described subsystems and for proper configuration and operation of:

1. Real-time recording, frame rate recording (at each frame rate), and back-up archive recording
2. Retrieval of video, both short term and archive video. Test for retrieval of video based on time and date retrieval
3. Scheduled recording
4. Status displays
5. System alerts
6. Network Alerts and monitoring software - Cisco Works
7. Alarm review software
8. Video authentication/ watermarking
9. System security by User login ID
10. Video query
11. Video loss detection
12. Alarm recording
13. On-demand recording
14. Continuous recording
15. Integrity of video storage
16. Logging functions

17. Video-export functions
18. View live video features
19. Alarm review software operation
20. Alarm history integrity

B. Problem Correction: Any problems encountered including damage to Department-owned equipment and DVRMS elements during this test shall be documented and brought to the attention of Engineer and corrected at Contractor's expense. Contractor shall promptly correct problems encountered, providing field service personnel appropriately trained for the types of problems encountered.

C. Test Documentation: Contractor shall supply forms to be used during these tests for Engineer and Contractor to authorize/initial test documentation. This form shall clearly define the items tested, leaving room for the date, DVRMS component designation, confirmation of camera view, and initials. DVRMS functions shall be demonstrated to ensure operation as required by these Specifications and Drawings.

3.3 TRAINING

A. Provide DVRMS operation and administration and maintenance training for Department's Security Division. Two categories of system training shall be provided. System operational training shall be provided for a minimum of 6 operations personnel and administration/ maintenance training for a minimum of 2 maintenance personnel. Training shall be provided multiple times and at the intervals specified below. One session shall be provided during daytime working hours, and 1 session during evening working hours, with specific days, work shifts, and hours for training to be selected by Engineer. Training sessions and intervals shall be as follows:

1. System Pre-Acceptance training: To be provided 2 weeks before system turnover to Department.
2. Follow-up Training Session: To be provided between 15 and 30 days after pre-acceptance training, with time and date to be selected by Engineer.

B. In addition to the training noted above, Contractor shall pay for Factory Certification Training for 2 Department personnel to be held at the manufacturer’s facility to fully certify the personnel to administer and maintain the system provided. Contractor shall include costs for the training including a per diem rate for food and hotel. Airfare shall also be included in the cost. The training shall not be less than a 3 day training course that is focused on the actual system provided for  Department including any specialized programming or features specific to that site. This training shall permit the technicians to provide service to the system during the warranty period, when required, without voiding the conditions of the warranty, in order to minimize system down time.

C. Provide 3 copies of factory produced training tapes for DVRMS operation training. In addition, Contractor shall Video record 1 operational and 1 maintenance class session at each training interval and provide copies of each tape to Engineer. Provide training materials for each attendee to use at each training session and keep for reference. Provide 5 copies of each piece of training material used at each session at the completion of each training session for future use.

3.4 ACCEPTANCE

A. Acceptance shall be withheld until the successful completion of the following:

1. Acceptance of submittals

2. Delivery of final documentation (including As-Built Documents)

3. Successful testing

4. Successful demonstration of recording ability, operator and administrator training and documentation review by Engineer.

3.5 INSTALLATION

A. Contractor personnel shall comply with applicable state and local licensing requirements.

B. Contractor's or subcontractor's main resources within Project shall carry proper professional certification issued by the manufacturer and verified by a third party organization to confirm sufficient product and technology knowledge.

C. Carefully follow instructions in documentation provided by the manufacturer to ensure steps have been taken to provide a reliable, easy-to-operate system.

D. Equipment shall be tested and configured in conformance with instructions provided by the manufacturer prior to installation.

E. Firmware found in products shall be the latest and most up-to-date provided by the manufacturer, or of a version as specified by the provider of DVRMS.

F. Equipment requiring users to log on using a password shall be configured with user/site-specific password/passwords. No system/product default passwords shall be allowed.

G. A proper installation shall meet NEC (National Electrical Code) NFPA 70 per the guidelines of that year’s revision. When properly installed equipment meets Low Voltage, Class 2 classification of NEC.

H. Install in conformance with manufacturer's written instructions.

I. Identification: Install permanent identification labels on conduits, junction boxes, conductors, and termination blocks.

J. Installation with minimal disruption of Department operations and installation and pre-installation activities are to be coordinated with Department, Engineer, and the affected Department tenants.

K. Contractor shall be fully responsible for any damage(s) caused by Contractor's Work and shall repair damage(s) including utilities and railroad related infrastructure and equipment at no additional cost to Department.

L. Specific Scopes of Work:

1. Restroom Building:

a. Install and make fully operational headend equipment in secure, clean, and climate controlled room (include maintenance station).

b. Connect the headend system to power and data network. Test connectivity of fiber and power capacity before installing any equipment.

c. Coordinate with Port Police and provide connectivity to their network.

2. Power and Data Network:

    a. Install and make fully operational power and data network per Project Drawings and Specifications.

3.6 CLOSEOUT ACTIVITIES

A. Demonstrate system operation and provide 2 hours of instruction with manufacturer's training personnel.

B. Conduct walking tour of Project and briefly describe function, operation, and maintenance of each component.

C. System Testing and Acceptance: Upon installation of DVRMS perform an installation test meeting the following requirements:

1. The installation test shall include confirmation of the field of view as scheduled and shown on Drawings and verification that video is being injected into the backbone fibers as specified. Test junctions from the input device to system output.

2. Any problems encountered, including damage to Department equipment during this test, shall be documented and brought to Engineer's attention and corrected at Contractor's sole cost and expense. Promptly correct problems encountered, providing field service personnel appropriately trained for the types of problems encountered.

3. Contractor shall supply a form to be used during these tests for authorization and initialing by Department, or authorized representative, and Contractor.

    a. This form shall clearly define the items tested, leaving room for the date, DVRMS element designation, and initials.

    b. Automated video surveillance functions shall be demonstrated to ensure operation as required by the Specifications and Project Drawings.

D. Acceptance shall be withheld until the successful completion of the following:

1. Acceptance of submittals.

2. Delivery of final documentation.

3. DVRMS aiming and approval.

4. System programming.

5. Successful testing.

6. Successful demonstration and training, including verification of proper operation to meet specified performance criteria for cameras and image stabilizers

3.7 OPERATION AND MAINTENANCE DATA

A. The intent of this Article is to require complete documentation of this system for the purpose of system operation and maintenance during and after the warranty period. It is intended that the drawing books and operation and maintenance manuals be exhaustive in the coverage of the system to the extent that they may be used as the sole guide to the trouble shooting, identification and repair of defective parts, adjustments, and operation.

1. Content: Manufacturer's standard literature, covering equipment included as a part of Project. Literature shall contain specifications, management procedures, component location diagrams, and replacement parts identification. References to equipment not supplied on this project shall be crossed out.

2. Special tools and test equipment list covering the tools and equipment required to maintain and test the system. List shall include the part name, number and source (including address and telephone number) for special tools.

B. Drawing books: The drawing books shall contain basic wiring diagrams, schematics, and functional details. It is required that everything in the system be neatly labeled and easily identifiable. Include the following drawings as a minimum:

1. Block Diagram: Provide an overall block diagram showing the interconnection of major system components.

2. Arrangement Drawings: Provide drawings showing the physical arrangement of major system components. Components shown in the block diagrams shall be clearly identified in such a manner as to be easily correlated with the actual field components.

3. Wiring Diagrams: Provide wiring diagrams showing field installed interconnecting wiring. Wiring identification on the diagrams shall agree with the wire markers installed on the equipment.

3.8 MAINTENANCE

A. Provide a separate maintenance contract for specified maintenance service.

B. Provide service and maintenance of system for 1 year from Final Acceptance.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. This section includes labor and material required for the installation and documentation of equipment including fixed (dome type) day/night high definition IP base cameras, fixed (bullet type) day/night high definition IP base cameras, PTZ (dome type) day/night high definition IP base cameras, 360 degree day/night high definition IP base cameras, camera poles/light poles connectivity, light system/camera view balancing, equipment room/filed switches, media extenders, Video Management System integration, power/fiber optic connectivity, training, and Performance Verification Testing (PVT) for an Electronic Video Surveillance System (EVSS):

1. Providing final powder coating color of cameras and mounting brackets to match lighting fixtures as directed. Providing cameras by manufacturers that allow color coating so as not to void warranty. Providing color coating per manufacturer’s instructions so as not to void camera warranty.

2. Provide and install within the light and or camera poles EVSS related new fiber optic cabling with non-metallic coating in order to maintain non-conductive capability.

3. Integration, programming and licensing of new cameras with a new Video Management System that communicates with local law enforcement systems as described in site specific scopes of Work.

4. Video Management System to include Digital Video Recording and Management System as described in site specific scopes of Work.

5. Provide 1-Year parts and labor warranty for equipment installed as a part of this Contract.

6. Equipment and materials used shall be standard components that are manufactured and available for purchase as standard replacement parts as long as the product is commercially available from the manufacturer.

7. Manufactured products shall be thoroughly tested and proven in actual use.

8. Manufactured products shall include, at no additional cost, online support services and availability of a toll-free (U.S. and Canada), 24-hour technical assistance program (TAP) for emergencies.

9. The manufacturer shall repair or replace without charge, manufactured products proven defective in material or workmanship for the stated warranty period from the date of shipment.

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 05 21 - 600 Volt or Less Rated Wiring System

C. Section 26 05 42 - PVC Conduit

D. Section 26 05 53 - Identification for Electrical Systems

E. Section 27 13 23 - Communications Optical Fiber Backbone Cabling

F. Section 28 05 07.23 - Uninterruptible Power Supply

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work in this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. 47 CFR 15 - Radio Frequency Devices.

B. BS 7958 - Closed Circuit Television (CCTV) - Management and Operation - Code of Practice.

C. BS 8418 - Design, Installation, Commissioning, and Maintenance of Detector-Activated Video Surveillance Systems (VSS) - Code of Practice.

D. CEI EN 50121-3-2 - Railway Applications - Electromagnetic Compatibility Part 3-2: Rolling Stock - Apparatus.

E. CEI EN 50121-4 - Railway Applications - Electromagnetic Compatibility Part 4: Emission and Immunity of the Signaling and Telecommunications Apparatus.

F. CEI EN 50132 - Alarm Systems - CCTV Surveillance Systems for Use in Security Applications.

G. CEI EN 50155 - Railway Applications - Rolling Stock - Electronic Equipment.

H. CEI EN 55022 - Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement.

I. CSA C22.2 No. 60950-1 - Information Technology Equipment - Safety.

J. EN 55024 - Information technology equipment - Immunity characteristics - Limits and methods of measurement.

K. IEC 60068-2-6 - Environmental Testing – Part 2-6: Tests – Test Fc: Vibration (Sinusoidal).

L. IEC 60068-2-27 - Environmental Testing – Part 2-27: Tests – Test Ea and Guidance: Shock.

M. IEC 62262 - Degrees of Protection Provided by Enclosures for Electrical Equipment Against External Mechanical Impacts.

N. IEEE 802.1X - Local and Metropolitan Area Networks—Port-Based Network Access Control.

O. NCP 104.3 - Code of Practice for Design, Installation and Maintenance of CCTV Surveillance Systems.

P. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

Q. NFPA 70 - National Electrical Code.

R. NFPA 731 - Standard for the Installation of Premises Security Systems.

S. UL 60950-1 - Information Technology Equipment – Safety – Part 1: General Requirements.

1.5 ACRONYMS

| | |
|---|---|
| AGC | Automatic Gain Control |
| API | Applications Programming Interface |
| API/SDK | Application Programming Interface/Software Development Kit |
| ARP | Address Resolution Protocol |
| AWB | Automatic White Balance |
| BLC | Back Light Compensation |
| CBR | Constant Bit Rate |
| CCD | Charge Coupled Device |
| CSM | Client Software Modules |

| | |
|---|---|
| CVBR | Constant and Variable Bit Rate |
| DHCP | Dynamic Host Configuration Protocol |
| DNR | Digital Noise Reduction |
| DNS | Domain Name Server |
| DVRMS | Digital Video Recording & Management System |
| EAP | Extensible Authentication Protocol |
| EO/IR | Electro-Optical/Infrared |
| FOC | Fiber Optic Cable |
| fps | frames per second |
| FTP | File Transfer Protocol |
| GUI | Graphical User Interface |
| HTTP | Hypertext Transfer Protocol |
| HTTPS | Secure Hypertext Transfer Protocol |
| ICMP | Internet Control Message Protocol |
| IGMP | Internet Group Management Protocol |
| IP | Internet Protocol |
| IR | Infrared |
| IVA | Intelligent Video Analytics |
| JPEG | Joint Photographic Experts Group |
| LAN/WAN | Local Area Network/Wide Area Network |
| LDAP | Lightweight Directory Access Protocol |
| MJPEG | Motion JPEG |
| MM | Multi-mode Fiber Optic Cable |
| MPEG | Moving Pictures Experts Group |
| NTP | Network Transfer Protocol |
| NTSC | National Television System Committee |
| NVR | Network Video Recorder |
| PoE | Power over Ethernet |
| PPPoE | Point-to-Point Protocol over Ethernet |
| PTZ | Pan, Tilt, Zoom |
| QoS | Quality of Service |
| RTP | Real-Time Transport Protocol |
| RTSP | Real-Time Streaming Protocol |
| SM | Single Mode Fiber Optic Cable |
| SMTP | Simple Mail Transfer Protocol |
| SNMP | Simple Network Management Protocol |
| SSH | Secure Shell |

| | |
|---|---|
| SSL | Secure Sockets Layer |
| SSM | Server Software Modules |
| TCP | Transmission Control Protocol |
| TCP/IP | Transmission Control Protocol/Internet Protocol |
| TWIC | Transportation Workers Identification Card |
| UDP | User Datagram Protocol |
| UPnP | Universal Plug and Play |
| VBR | Variable Bit Rate |
| VMS | Video Management System |
| WDR | Wide Dynamic Range |

1.6 SUBMITTALS

A. Shop Drawings: Indicate electrical characteristics and connection requirements, including system wiring diagram.

B. Product Data: Provide showing electrical and mechanical characteristics and connection requirements for each component. Provide an original manufacturers data sheet for each individual product. Where the data sheet reflects a range of products, the specific product utilized shall be indicated.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

D. Performance Verification Testing (PVT) Procedures and Reports: Submit plan indicating PVT methods, testing device calibration, and interpretations of test results for Field Acceptance Tests.

1. Submit the PVT plan at least 20 days prior to the scheduled start of the first test. The test plan shall detail the objectives of tests.

2. Tests shall clearly demonstrate that the video surveillance system installations performed by Contractor fully comply with the performance requirements specified.

3. Progress payments shall depend upon the successful completion of testing and documentation.

E. Training Materials: Submit training documentation required under Training Article of this Section.

F. Project Record Documents: Record actual locations of new and relocated cameras and routing of any and new cabling.

G. Operation and Maintenance Data: Include routine trouble shooting procedures and instructions for new equipment installed as a part of this Contract.

H. Warranty documentation.

1.7 QUALITY ASSURANCE

A. Products: Furnish products listed and classified by Underwriters Laboratories Inc., Tories Inc., or International Organizations for Standardization (ISO), as suitable for purpose specified and indicated.

B. Manufactured products shall be thoroughly tested and proven in actual use.

C. Equipment and materials used shall be standard components that are manufactured and available for purchase as standard replacement parts as long as the product is commercially available from the manufacturer.

D. Conform to requirements of standards such as:

1. NFPA 731

2. National Security Inspectorate (NSI) NCP 104.3

3. BS 7958 B

4. BS 8418

5. CEI EN 50132

1.8 QUALIFICATIONS

A. Company specializing in manufacturing the products specified in this section with minimum 5 years documented experience and with service facilities within 500 miles of Project.

1. A minimum of 2 fully operational and commissioned sites are required utilizing the same version of hardware and software proposed for this facility.

2. Manufacturer shall have a minimum of 7 years of experience in producing IP video equipment.

3. Provide references for sites required by Paragraph B of this Article including facility name, types of hardware and software installed, commissioning date, and facility contact person.

B. Provide Engineer with documentation that confirms roject referenced systems are fully functional and that key personnel are authorized by specified manufacturers.

C. Installers shall be trained and authorized by the manufacturer to install, integrate, test, and commission the system.

D. Key Personnel Qualifications: Authorized installer of specified manufacturer with service facilities within 500 miles of Project.

1. Key personnel shall possess at least 2 years of successful installation experience with projects utilizing High Definition IP Base CCTV systems, Image Stabilization, Video Systems, LAN/WAN, integration with existing systems, and wireless work similar to that required for this Project.

2. Key Personnel including Project Manager, Project Engineer, and Lead Installer shall provide information as to project experience.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver the camera in the manufacturer’s original, unopened, undamaged container with identification labels intact.

B. Store the camera in a temperature environment protected from mechanical and environmental conditions as designated by the manufacturer.

1.10 WARRANTY

A. Manufacturer shall provide a limited 3-year warranty for the product to be free of defects in material and workmanship.

B. Manufacturer shall provide options to extend the warranty by up to 5 years at the time of initial purchase.

C. Period: Contractor shall warrant labor, workmanship, and materials for a period of 1 year from the date of final acceptance. Should a failure occur within this 1 year to the system, Contractor shall provide labor and materials necessary to restore the system to the condition required for the final test and acceptance for Contract, at no cost to Department.

1. Offer an “Optional 1 Year Extended Warranty” package renewable for up to 3 years to Department. Department shall inform Contractor of the acceptance or rejection of the first year of the package prior to the expiration of the warranty period as noted above. Provide a price for each year individually and this shall be available to Department. Notify Engineer in writing 2 months prior to warranty expiration to determine the status of the optional 1 year warranty.

2. System Add, Changes, or Moves: During the warranty period, additional cameras and other equipment may be connected to the system and some cameras may be relocated or removed. Neither the installation of any new cameras, the connection of any new equipment nor the relocation and removal of any existing cameras shall void this warranty.

3. Manufactured products shall include, at no additional cost, online support services and availability of a toll-free (U.S. and Canada), 24-hour technical assistance program (TAP) for emergencies.

PART 2 - PRODUCTS

2.1 SYSTEM

A. The systems shall consist of new, fixed dome, fixed bullet, PTZ, and 360 degree High Definition Day/Night Color IP camera types, Digital Video Recording and Management System, and associated encoders, enclosures, mounts, power supplies, cabling, and any other associated or required part required for full system functionality. These shall be installed at various locations and connected back to the video management system by existing infrastructure or Contractor provided infrastructure as shown on Drawings.

B. NOTE: Contractor shall be responsible for installing equipment which meet or exceed the performance specifications in this section, which Contractor shall procure, install, and make fully operational. Test cameras for satisfactory functionality and as described in scope of Work.

## 2.2 SYSTEM DESCRIPTION

A. The new Video Surveillance System within Project boundaries provides surveillance of various areas which are of security and/or operational interest to the Port. The Port has determined that there are functional requirements for the system, including mounting locations which are subject viewing large public gathering areas, parking lots, public pathways, and semi-isolated areas, as well as areas which could benefit from enhanced coverage. The Port intends to address public safety surveillance through the following Project objectives:

1. Installing new dome type fixed cameras with low-light capability and required physical infrastructure to provide surveillance coverage of those areas indicated on Drawings.

2. Installing new bullet type fixed cameras with low-light capability and required physical infrastructure to provide surveillance coverage of those areas indicated on Drawings.

3. Installing new PTZ cameras with low-light capability and required physical infrastructure to provide surveillance coverage of those areas indicated on Drawings.

4. Installing new 360 degree cameras with low-light capability and required physical infrastructure to provide surveillance coverage of those areas indicated on Drawings.

5. Powder coating color of cameras and mounting brackets to match lighting fixtures as directed. Providing color coating per manufacturer’s written instructions so as not to void camera warranty.

6. Install camera infrastructure to support cameras in 120 VAC power mode and fiber optic communications mode.

7. Balancing the camera capability with that of the designed lighting system in order to maintain same surveillance capability during all times of day.

8. Providing and installing new fiber optic and power network to support EVSS as shown on Drawings and as described in site specific scopes of work.

9. Installation within the light and or camera poles EVSS related new fiber optic cabling with non-metallic coating in order to maintain non-conductive capability.

10. Video Management System to include Digital Video Recording and Management System as described in site specific scopes of work.

11. Integration, programming and licensing of new cameras with an existing Video Management System that communicates with local law enforcement systems as described in site specific scopes of work.

B. Contractor is responsible for equipment additions and system changes.

2.3 BASIC EQUIPMENT CAPABILITIES

A. Cameras shall be IP-based and comply with established network and video standards.

B. Cameras shall capable of being be powered by the switch utilizing the network cable. Power injectors (midspans) shall be provided by Contractor when required for proper operation.

C. Cameras shall be fully supported by an open and published API (Application Programmers Interface), which shall provide necessary information for integration of functionality into third party applications.

D. The following capabilities are considered essential for the equipment described in this Specification.

1. High Definition Fixed, PTZ, and 360 degree Day/Night IP Compatible Cameras. Cameras shall be equipped with a variable focus 3 - 9 MM lens as to allow Contractor to provide the most optimal view possible to the Port.

2. Cameras to be equipped with integrated Video Image Stabilizers which shall mitigate viewing difficulties caused by PTZ cameras mounted on poles and subject to unwanted movement.

E. List of pertinent conceptual layout drawings (separate documentation). Note - RFP drawings are conceptual only and are provided for basic information to support the RFP.

2.4 PRODUCT PERFORMANCE SPECIFICATIONS

A. Cameras are to be compatible with Verint Nextiva 6.4.

B. Exterior Rated Hi-Definition vandal-resistant (IK 10) network fixed dome camera with integral auto-iris varifocal lens. Camera shall be Axis, Bosch, or approved equivalent, and shall have the following capabilities at a minimum:

1. The environmental network dome camera shall offer multiple simultaneous video streams with 2 megapixel (MPx), 1920x1080 resolution, auto iris and varifocal lens.

2. The environmental network dome camera shall provide a manual 3-axis (pan/tilt/rotation) positioning to allow adjustment for optimum camera rotation and placement.

3. The environmental network dome camera shall provide options for clear and smoked lower dome.

4. The environmental network dome camera shall provide Wide Dynamic Range (WDR), low-light performance, anti-bloom technology, 3-D noise filtering, and enhanced tone mapping, operating simultaneously.

5. The environmental network dome camera shall feature an unsupervised/supervised alarm input, relay output, and line level/external microphone input connections.

6. The environmental network dome camera shall provide a removable, local storage medium (Micro SD) for scheduled and event-based recording of images.

7. The environmental network dome camera shall provide advanced low-light capabilities for day and night models with sensitivity down to 0.005 lux in color and 0.0013 lux in monochrome.

8. The environmental network dome camera shall support industry standard Power over Ethernet (PoE) IEEE 802.3af, Class 3 to supply power to the camera over the network.

9. The environmental network dome camera shall provide True Wide Dynamic Range (WDR) up to 100 dB with dynamic adjustments through the User Interface.

10. The environmental network dome camera shall have a mechanical IR cut filter mechanism for increased sensitivity in low-light installations. Set points for the IR cut filter feature shall be configurable through an embedded Web browser.

11. The environmental network dome camera shall support H.264 High, Main or Base profiles, using constrained variable bit rate (CVBR) as the default, variable bit rate (VBR), or constant bit rate (CBR) with target range.

12. The environmental network dome camera shall support two simultaneous, configurable video streams. H.264 and MJPEG compression formats shall be available for primary and secondary streams with selectable Unicast and Multicast protocols.

13. The environmental network dome camera shall support configurable frame rates, bit rates and group of pictures (GOP) structures for additional bandwidth administration.

14. The environmental network dome camera shall be in conformance to Open Network Video Interface Forum (ONVIF) Profile S and Profile G, and support open architecture best practices with a published API available to third-party network video recording and management systems.

15. The environmental network dome camera shall provide IEEE 802.1X port security to establish point-to-point access through a wired or wireless port using Extensible Authentication Protocol (EAP). Supported EAP methods shall include EAP-MD5, EAP-TLS, EAP-TTLS, EAP-PEAP and EAP-FAST.

16. The environmental network dome camera shall support SNMP v2c and v3.

17. The environmental network dome camera shall support IPv6 configurations in conjunction with IPv4.

18. The environmental network dome camera shall provide Auto or Manual exposure settings for adjusting the amount of light detected by the camera sensor.

19. The environmental network dome camera shall provide user-selectable configurations for day/night auto mode. Transitional levels shall be used to set the desired light level for transitioning to night mode. Transition detect time shall control the length of time that the camera is exposed to a light level before changing to color or monochrome mode.

20. The environmental network dome camera shall provide flicker correction.

21. The environmental network dome camera shall provide motorized zoom capabilities with a Web browser interface for remote configuration and administration.

22. The environmental network dome camera shall provide autofocus capabilities with a Web browser interface for remote configuration and administration. User-selectable options for full-range auto-focus and quick auto-focus shall be available.

23. The environmental network dome camera shall provide autofocus options based upon a manual trigger, day and night transition upon every

    a. 10-degree C temperature change, and once every 24 hours to ensure focus.

24. The environmental network dome camera shall support 16 window blanks to conceal user-defined privacy areas that cannot be viewed by an operator.

25. The environmental network dome camera shall provide I-Frame interval configuration to increase or decrease the number of I-Frames per second.

26. The environmental network dome camera shall provide User and Group settings to assign permissions and access levels to the camera. The camera shall provide local management where the camera manages the access levels or remote mode where the camera authenticates the user through a Lightweight Directory Access Protocol (LDAP) server.

27. The indoor network camera system shall provide integrated video analytics with the ability to provide hardware and software alarms based on the analytic behaviors.

    a. Shall be configured and enabled using a standard Web browser.

    b. Allow remote operation and alarm notification.

    c. Analytics to include:

        1) Abandoned Object: Detects objects placed within a defined zone and triggers an alarm if the object remains in the zone longer than the user-defined time allows.

        2) Adaptive Motion: Detects and tracks objects that enter a scene and then triggers an alarm when the objects enter a user-defined zone.

3) Camera Sabotage: Detects contrast changes in the field of view. An alarm is triggered if the lens is obstructed with spray paint, a cloth, or a lens cap. Any unauthorized repositioning of the camera also triggers an alarm.

4) Directional Motion: Generates an alarm in a high traffic area when a person or object moves in a specified direction.

5) Loitering Detection: Identifies when people or vehicles remain in a defined zone longer than the user-defined time allows.

6) Object Counting: Counts the number of objects that enter a defined zone or cross a tripwire.

7) Object Removal: Triggers an alarm if an object is removed from a defined zone.

8) Stopped Vehicle: Detects vehicles stopped near a sensitive area longer than the user-defined time allows.

28. The environmental network dome camera shall be vandal and tamper resistant with an impact resistance exceeding rating of K10++ (50 Joules) per IEC 62262.

29. The environmental network dome camera shall be plenum-rated per NFPA 70 Article 300.22(C)(2).

30. The environmental network dome camera shall be NEMA-4X, IP66 rated.

31. The environmental network dome camera shall provide a 3/4-inch (in) NPT conduit attachment on the side and top of the back box for in-ceiling and surface mounted applications.

32. The environmental network dome camera shall attach to a standard 4-inch square box or standard 2-gang electrical box for surface mounted applications.

33. The environmental network dome camera shall provide a 1.5-inch NPT conduit attachment for pendant mounted applications.

34. The environmental network dome camera shall be capable of firmware upgrades through a network using a software-based device utility.

35. The environmental network dome camera shall meet or exceed the following design and performance specifications.

    a. Camera Specifications:

| | |
|---|---|
| Imaging Device | 1/3.6 inch (effective) progressive scan RGB CMOS |
| Resolutions | 2048x 1536 (3 MP) to 160x120 |
| Lens | M12 mount, Fixed iris, IR corrected<br><br>2.0 mm, F2.0<br><br>Horizontal field of view: 1068 |
| Shutter Time | 1/30500 seconds to 2 seconds |
| Light<br><br>Sensitivity/Minimum Illumination | Color: 0.3-200000 lux, F2.0, B/W: 0.06 lux, F2.0 |
| Day/Night Capabilities | Yes |
| Day and Night | Automatically removable infrared-cut filter |
| Available Languages | Chinese, English, French, German, Italian, Portuguese, Russian, and Spanish |

    b. Lens Specifications:

| | |
|---|---|
| Lens Type | Built-in; varifocal |
| Focal Length | f/1.2, 3 shall be approximately 9 millimeters (mm) |
| Focus | Autofocus, motorized |
| Zoom | Remote |
| Auto Iris Type | DC drive P-iris lens |

c. Video Specifications:

| | |
|---|---|
| Video Streams | Multiple simultaneous streams with up to 2 different configurations plus service stream; the second stream is variable based on the setup of the primary stream |
| Available Resolutions 4:3 Aspect Ratio<br><br>16:9 Aspect Ratio | Two configurable streams as follows:<br><br>1.2 MPx (1280 x 960) 0.5 MPx (800 x 608) 0.3<br><br>MPx (640 x 480) 0.08 MPx (320 x 240)<br><br>720p MPx (1280 x 720) 0.5 MPx (800 x 448)<br><br>0.2 MPx (640 x 352) 0.06 MPx (320 x 176) |
| Frame Rate | Up to 30, 25, 15, 12.5, 10, 5, 1 (depending on the coding, resolution, and stream<br><br>configuration) |
| Video Encoding | H.264 High, Main, or Base profiles MPEG |
| Bit Rate Control | Constrained variable bit rate (CVBR), constant bit rate (CBR), and variable bit rate (VBR) with target rang |
| Service Stream | JPEG stream; the aspect ratio shall be consistent with the independent streams |
| Supported Protocols | TCP/IP, UDP/IP (Unicast, Multicast IGMP), UPnP, DNS, DHCP, RTP, RTSP, NTP, IPv4, IPv6, SNMP v2c/v3, QoS, HTTP, HTTPS, LDAP (client), SSH, SSL, SMTP, FTP, ARP, ICMP, and IEEE 802.1x (EAP) |

| | |
|---|---|
| UsersUnicastMulticast | Up to 20 simultaneous users depending on the resolution settingsUnlimited H.264 |
| Security Access | Password Protected |
| Software Interface | Web browser view and setup |
| Pelco System Integration | Digital Sentry 7.3 (or later); Endura 2.0 (or later); DX4700/DX4800 |
| Open API | Pelco API or ONVIF Profile S and Profile G |
| Mobile Application | Integrated with Pelco Mobile Application |
| Minimum PC Requirements: | |
| Processor | Intel® Core™ i3 processor, 2.4 GHz |
| Operating System | Microsoft® Windows® 10 (32- and 64-bit), or Mac OS® X 10.4 (or later) |
| Memory | 4 GB RAM |
| Network Interface | 100 Megabits (or greater) |
| Monitor | Minimum of 1024 X 768 resolution, 16- or 32-bit pixel color resolution |
| Web Browser | Microsoft Edge® (or later) or Mozilla Firefox® 3.5 (or later) is recommended for configuring analytics |
| Media Player | Pelco Media Player or QuickTime® 7.6.5 for Windows 10; or Mac OS X 10.4 (or later) |

d. Electrical Specifications:

| | |
|---|---|
| Network Port | RJ-45 for 100Base-TX, Auto MDI/MDI-X |
| Accessory Port | Micro B USB connector for Pelco accessories |
| Cable Type | Cat5 cable or better for 100Base-TX |
| Input Power | PoE (IEEE 802.3af, Class 3) |
| Power Consumption | 8.5 W nominal |

| | |
|---|---|
| Current Consumption | 350 mA maximum |
| Local Storage | Micro SD, SDHC |
| Alarm: Unsupervised<br>Supervised<br><br><br><br>Input | Unsupervised/supervised modes: Detects open or closed alarm state Detects open and short alarm state with external 1 kohm resistor<br><br>3.5 VDC maximum, 3.5 mA maximum |
| Relay Output | ±32 VDC maximum, 150 mA maximum |
| Audio: Streaming Input/Output<br><br><br>Compression | Bidirectional; full or half duplex<br><br>Line level/external microphone input; 600-ohm differential, 1 Vp-p max signal level G.711 PCM 8 bit, 8 kHz mono at 64 kbit/s |

e. Analytic Specifications:

| | |
|---|---|
| Required Systems for<br><br>Pelco Analytics: | |
| Pelco Interface Open API | WS5200 Advanced System Management Software on an Endura 2.0 (or later) system The Pelco API can transmit behavior alarm data to third-party applications, available at<br><br>pdn.pelco.com |
| Mechanical Specifications: | |
| Dome Attenuation: | |
| Clear | Zero light loss |
| Smoked | f/1.0 light loss |
| Pan/Tilt Adjustment | Manual |
| Pan | 355 degrees |
| Tilt | 180 degrees |

| | |
|---|---|
| Rotation | 360 degrees |
| Environmental Specifications: | |
| Operating Temperature | Minus 40 degrees to122 degrees Fahrenheit (F) |
| Cold Start | Minus 4 degrees F |
| Operating Humidity | 10 to 95 percent, RH condensing |
| Impact Resistance | K10++50 Joules per IEC 62262 |
| Shock and Vibration | CEI EN 50155 Category 1, Class B;IEC 60068-2-6 and IEC 60068-2-27 |
| Certifications: CE, Class A FCC, Class A ICES-003, Class A UL/cUL Listed KCC C-Tick CB Meets NEMA Type 4X IP66 standards, IP56 standards, compliant with applicable immunity sections of CEI EN 50155, CEI EN 50121-3-2, and CEI EN 50121-4 ONVIF Profile S and Profile G Conformant | |

36. Pelco Model Numbers:

    a. IME1xx-1x Series: Environmental, Vandal-resistant, 1 MPx resolution network dome camera

C. Exterior Rated Hi-Definition vandal-resistant network fixed bullet type camera with integral auto-iris varifocal lens. Camera shall be Sarix IBP Series (IBP322-1R) Environmental Bullet, and shall have the following capabilities at a minimum:

1. The network camera system shall offer two simultaneous video streams with up to 3 MPx, 2048 x 1536 resolution, auto iris, and varifocal lens capabilities.

2. The network camera system shall possess the following primary characteristics:

    a. H.264 High, Main or Base profiles; and MJPEG compression

    b. up to 3 megapixels

    c. dual streaming (two independent IP video streams)

    d. day/night operation with IR cut filter

    e. Wide Dynamic Range (WDR): 130 dB

f. PoE (IEEE 802.3af, Class 3), 24 VAC, 12 VDC

g. multicast and unicast capable with unlimited H.264 viewers

h. unicast capable with up to 20 simultaneous viewers

i. local storage via SD/SDHC/SDXC

j. audio input and output

k. alarm input and output

l. IP66 and IK10 (including front)

m. Type 4X (environmental models only)

3. Imaging Device:

a. 3 MPx

b. Sensor 1/2, 8-inch

c. Maximum Resolution 2048 x 1536

4. Imager Type: CMOS

5. Electronic Shutter Range: 1/20,000 seconds (or faster) to 2 seconds

6. Minimum Illumination:

a. Color Code:

| Model | Sensitivity | Lens |
|---|---|---|
| 1, 2, & 3 MPx | 0.200 lux (33 ms, f/1.6) | 9-22 millimeter (mm) |
| 1, 2, & 3 MPx | 0.010 lux (500 ms, f/1.6) | 9-22 mm |

b. Black and White Mode:

| Model | Sensitivity | Lens |
|---|---|---|
| 1, 2, & 3 MPx | 0.100 lux (33 ms, f/1.6) | 9-22 mm |
| 1, 2, & 3 MPx | 0.0025 lux (500 ms, f/1.6) | 9-22 mm |

c. Black and White Mode with IR on:

| Model | Sensitivity | Lens |
|---|---|---|
| 1, 2, 3 MPx | 0.000 lux | 9-22 mm |

7. Scanning: Progressive
8. Image Control Settings:
    a. White balance range: 2,000 degrees to 10,000 degrees K
    b. Adaptive IR Illumination up to 100 feet
    c. Day and night settings
    d. Privacy zone definition: Up to 16 zones of window blanking
    e. 3D noise reduction
9. Lens:
    a. Built-in, varifocal
    b. Focal Length: F1.6, 9 ~ 22 mm
    c. Zoom: Remote
    d. Auto Iris: P-iris lens
    e. Auto Focus: Four user-selectable modes of automatic focus during runtime operation
    f. Every 10 degrees in Celsius temperature change
    g. Day/night transition
    h. Every 24 hours
    i. Manual trigger
10. Field of View:

| Lens | Focal Length Horizontal | Vertical | Mode | Aspect Ratio |
|---|---|---|---|---|
| 9 ~ 22 mm | Wide | 33 degrees | 24 degrees | 4:3 |
| 9 ~ 22 mm | Tele | 14 degrees | 10 degrees | 4:3 |
| 9 ~ 22 mm | Wide | 30 degrees | 14 degrees | 16:9 |
| 9 ~ 22 mm | Tele | 13 degrees | 7 degrees | 16:9 |

11. Video:
    a. The network camera system shall support up to 2 simultaneous streams; the secondary stream is variable based on the setup of the primary stream.
    b. Compression type: H.264 High, Main, or Base profiles; and MJPEG
    c. Corridor Mode: Image rotate 90 degrees, 180 degrees, 270 degrees. Image mirror.
    d. Service Stream: 640 by 480 or 640 by 352; 2 ips, JPEG
    e. Resolution:

| MPx | Width x Height | Aspect Ratio |
|---|---|---|
| 3.0 | 2048 x 1536 | 4:3 |

    f. Constrained variable bit rate (CVBR) and constant bit rate.
    g. Frame Rate:
        1) Images per Second (ips) (depending on the coding, resolution, stream and WDR configuration)
        2) Up to 60, 50, 30, 25, 20, 16, 15, 12, 10, 8, 7, 6, 5, 4, 3, 2, 1
    h. Video streams shall support ONVIF profile S.
    i. Low resolution JPEG stream for configuration of camera settings.
12. Storage and Recording:
    a. The network camera system control shall have onboard micro SD card storage.
        1) Card type: SD
        2) Capacity: up to 128 GB
    b. The local SD storage shall have the ability to be backed up to alternate media without removal of the SD card from the camera.
    c. Local recording on the SD card shall commence upon loss of network connectivity, or based on a pre-programmed schedule. Note: The camera shall record if it still has power during a network outage.

d. The network camera system shall record video continuously in the case of network outage. Note: The camera shall record if it still has power during a network outage.

e. Alarm recording: The network camera system shall capture selectable 1, 5, 10 15, 30 and 30 second video clips on camera sabotage, motion detection, or alarm input.

f. Video recording and storage shall support ONVIF profile G.

13. Manual Pan Tilt:

a. Pan Range: 360 degrees

b. Tilt Range: plus 5, minus 90 degrees

c. Rotate Range: 360 degrees

14. Suite of eight built-in analytics:

a. Abandoned Object

b. Intrusion Detection

c. Camera Sabotage

d. Wrong Direction

e. Loitering Detection

f. Object Counting

g. Object Removal

h. Stopped Vehicle

D. Exterior Rated Hi-Definition vandal-resistant network PTZ dome type camera with integral auto-iris varifocal lens. Camera shall be AXIS Q6052-E PTZ Dome Network Camera or approved equivalent, and shall have the following capabilities at a minimum:

1. Camera:

| | |
|---|---|
| Image Sensor | 1/2.8 inches progressive scan CMOS |
| Lens | 3.3-119 millimeter (mm), F1.4-4.2 Horizontal angle of view: 47.0 degrees to 1.5 degrees Vertical angle of view: 35.5 degrees to 1.1 degrees Autofocus, auto-iris |
| Day and night | Automatically removable infrared-cut filter |
| Minimum illumination | Color: 0.15 lux at 30 IRE F1.4 Color: 0.25 lux at 50 IRE F1.4 B/W: 0.008 lux |
| Shutter time | 1/30000 seconds to 1/0.75 seconds with 50 Hz 1/30000 seconds to 1.0 seconds with 60 Hz |
| Pan/Tilt/Zoom | Pan: 360 degrees endless, 0.05 degrees to 450 degrees per second. Tilt: 220 degrees, 0.05 degrees to 450 degrees per second 36x optical zoom and 12x digital zoom, total 432x zoom E-flip, 256 preset positions, Tour recording, Guard tour, Control queue, On-screen directional indicator, Set new pan 0 degrees, Adjustable zoom speed, Focus recall |

2. Video:

| | |
|---|---|
| Video compression | H.264 (MPEG-4 Part 10/AVC] Baseline, Main and High Profiles Motion JPEG |
| Resolutions | DI 720 by 576 to 176 by 144 (50 Hz) DI 720x480 to 176x120 (60 Hz) |
| Frame rate | Up to 50-60 fps (50/60 Hz) in all resolutions, Capture mode NTSC: Up to 60 fps in all resolutions, Capture mode PAL: Up to 50 fps in all resolutions |

| | |
|---|---|
| Video streaming | Multiple, individually configurable streams in H.264 and Motion JPEG Axis' Zipstream technology Controllable frame rate and bandwidth VBR/MBR H.264 |
| Image settings | Manual shutter time, compression, color, brightness, sharpness, white balance, exposure control, exposure zones, fine tuning of behavior at low light, rotation: 0 degrees, 180 degrees, text and image overlay, 32 individual 3D privacy masks, image freeze on PTZ, automatic defog, backlight compensation Electronic Image Stabilization (EIS) Wide Dynamic Range (WDR):<br><br>110 dB, shadows and highlights recovery |

3. Network:

| | |
|---|---|
| Security | Password protection, IP address filtering, HTIPSa encryption, IEEE 802.1Xa network access control, Digest authentication, User access log, Centralized Certificate Management |
| Supported protocols | 1Pv4/v6, HTTP, HTTPSa, SSL/TLSa, QoS Layer 3<br><br>DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnP™, SNMP v1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, SFTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS, SSH, NTCIP |

4. System Integration:

| | |
|---|---|
| Application Programming Interface | Open API for software integration, including VAPIXR and AXIS Camera Application Platform; specifications at www.axis.com AXIS |

| | |
|---|---|
| | Video Hosting System (AVHS) with One-Click Connection ONVIF Profile S, specification at www.onvif.org |
| Analytics | Video motion detection, Autotracking, Active Gatekeeper Support for AXIS Camera Application Platform enabling installation of third-party<br><br>applications, see www.axis.com/acap |
| Event triggers | Detectors: Live stream accessed, Video motion detection, Shock detection Hardware: Fan, Network, Temperature, Casing open PTZ: Autotracking, Error, Moving, Ready, Preset Reached Storage: Disruption, Recording System: System Ready Time: Recurrence, Use Schedule Input signal: Manual trigger, Virtual input |
| Event actions | Day/night mode, overlay text, video recording to edge storage, pre- and post-alarm video buffering, send SNMP trap PTZ: PTZ preset, start/stop guard tour File upload via FTP, SFTP, HTTP, HTTPS network share and email Notification via email, HTTP, HTTPS and TCP |
| Data Streaming | Event data |
| Built-in installation aids | Pixel counter |

5. General:

| | |
|---|---|
| Casing | IP66-, NEMA 4X- and IK10-ratc:d Metal casing<br><br>(aluminum), polycarbonate (PC) clear dome, sunshield (PC/ASA) |
| Sustainability | PVC free |
| Memory | 512 MB RAM, 128 MB Flash |
| Power | Axis High PoE midspan 1-port: 100-240 V AC, max 74 W Camera consumption: typical 16 W,<br><br>max 60 W |
| Connectors | RJ45 10BASE-T/100BASE-TX PoE, RJ45 |

| | |
|---|---|
| | Push-pull Connector (IP66) included |
| Storage | Support for SD/SDHC/SDXC card, Support for recording to dedicated network-attached storage (NAS) For SD card and NAS recommendations see www.axis.com |
| Operating conditions | With 30 W midspan: minus 20 degrees C to 50 degrees C (minus 4 degrees F to 122 degrees F) With 60 W midspan: minus 14 degrees C to 50 degrees C (minus 58 degrees F to 122 degrees F) Maximum temperature (intermittent): 60 degrees C (140 degrees F) Artic Temperature Control: Start-up as low as minus 40 degrees C (minus 40 degrees F) Humidity 10-100 percent RH (condensing) |
| Storage conditions | Minus 40 degrees C to 65 degrees C (minus 40 degrees F to 149 degrees F) |
| Approvals | CEI EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 61000-6-1, EN 61000-6-2, EN 55024, FCC Part 15 Subpart B Class A, ICES-003 Class A, VCCI Class A, RCM AS/NZS CISPR 22 Class A, KCC KN32 Class A. KN35 Safety IEC/EN/UL 60950-1 IEC/EN/UL 60950-22 Environment EN 50121-4, IEC 62236-4, IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-6, IEC 60068-2-14, IEC 60068-2-27, IEC 60721-4-3, NEMA EN 10250 Type 4X, IEC 60068-2-30, IEC 60068-2-60, IEC 60068-2-78, NEMA ANSI/IEC 60529 IP66, NEMA TS-2-2003 v02.06, Subsection 2.2.7, 2.2.8, 2.2.9, IEC 62262 IK10, ISO 4892-2 Midspan EN 60950-1, GS, UL, cUL, CE, FCC, VCCI, CB, KCC, UL-AR |
| Weight | 3.7 kilograms (kg) (8.2 pounds (lb)) |
| Dimensions | 0232 x 280 mm (9.1 x 11.0 inch) |
| Included accessories | Axis High PoE 60 W midspan 1-port, RF45 Push-pull Connector (IP66), Sunshield Installation Guide, Windows decoder 1-user license |

| | |
|---|---|
| Optional accessories | Smoked dome cover AXIS T91 Mounting Accessories, AXIS T8415 Wireless Installation Tool, AXIS T90 illuminators, AXIS T8310 Video Surveillance Control Board, Multi-user decoder license pack |
| Video management software | AXIS Camera Companion, AXIS Camera Station, Video management software from AXIS' Application Development Partners available on https://www.axis.com/support/software |
| Languages | English, German, French, Spanish, Italian, Russian, Simplified Chinese, Japanese, Korean, Portugese, Traditional Chinese |
| Warranty | AXIS 3-year warranty and AXIS Extended Warranty option, see www.axis.com/warranty |

E. Exterior Rated Hi-Definition vandal-resistant network 360 degree type camera with integral auto-iris varifocal lens. Camera shall be Optera IMM Series with Surevision 2.0, and shall have the following capabilities at a minimum:

1. IP Panoramic indoor/outdoor multi-sensor camera system shall transparently integrate video across sensor’s in the camera presenting a seamless fully stitched and blended total resolution of 12 megapixel (MPx), 2048 by 1536 by 4.

2. IP Panoramic indoor/outdoor multi-sensor camera system technology shall include options for 180 degrees, 270 degrees and 360 degrees camera functionality as well as provide pan and tilt adjustment of the camera module for 180 degree models and pan for 270 degrees and 360 degrees modules.

3. In conjunction with a Video Management System “VMS” that integrates the Panomersive Toolkit, the camera shall be able to support seamless panoramic views and simultaneous Immersive Views that allow for the pan, tilt and zoom in, across the entire field of view.

4. IP Panoramic indoor/outdoor multi-sensor camera system housing technology shall meet the IK10 impact specification as well as standard mounting hardware capabilities that would include but not be limited to Pendant, Surface, and Ceiling mount hardware.

5. IP Panoramic indoor/outdoor multi-sensor camera system shall provide SureVision™ 2.0 technology that seamlessly delivers extended True Wide Dynamic Range (WDR), low-light performance, and anti-bloom technology, operating in a simultaneous mode of operation.

6. IP Panoramic indoor/outdoor multi-sensor camera system shall provide a slot for a removable, local storage medium (not provided by camera manufacturer) (Micro SD) to capture video clips of varying lengths in conformance with ONVIF G Profile. Any Video Management System "VMS" that is conformant to this standard can initiate storage and retrieval of video, for instance to safeguard against network failure.

7. IP Panoramic indoor and outdoor multi-sensor camera system shall provide a service video stream in addition to and independent of the video streams.

8. IP Panoramic indoor and outdoor multi-sensor camera system shall provide advanced low-light capabilities for day/night models with sensitivity down to 0.03 lux for the 180 degrees and 0.05 lux in the 270 degrees and 360 degrees models respectively while in night mode.

9. IP Panoramic indoor/outdoor multi-sensor camera system shall support industry standard Power over Ethernet Plus (PoE+) IEEE 802.3at, Class4 to supply power to the camera over the network.

10. IP Panoramic indoor/outdoor multi-sensor camera system shall provide options for clear and smoked lower domes.

11. IP Panoramic indoor/outdoor multi-sensor camera system shall provide Wide Dynamic Range (WDR) up to 120 dB with dynamic adjustments through the User Interface across the cameras field of view.

12. IP Panoramic indoor/outdoor multi-sensor camera system shall have a mechanical IR cut filter mechanism for increased sensitivity in low-light installations. Set points for the IR cut filter feature shall be configurable through an embedded Web browser.

13. IP Panoramic indoor/outdoor multi-sensor camera system shall support H.264 High, Main or Base profiles, using constrained variable bit rate (CVBR) as the default, variable bit rate (VBR), or constant bit rate (CBR) with target range.

14. IP Panoramic indoor/outdoor multi-sensor camera system shall provide IEEE 802.1X port security to establish point-to-point access through a wired or wireless port using Extensible Authentication Protocol (EAP).

15. IP Panoramic indoor/outdoor multi-sensor camera system shall conform to ONVIF Profile S and Profile G, and support open architecture best practices with a published API available to third-party network video recording and management systems. A “Panomersive” SDK that would enable Video Management Systems to d-warp the streams from this camera into panoramic and Immersive Views shall be made available.

16. IP Panoramic indoor/outdoor multi-sensor camera system shall support SNMP v2c and v3.

17. IP Panoramic indoor/outdoor multi-sensor camera system shall support IPv6 configurations in conjunction with IPv4.

18. IP Panoramic indoor/outdoor multi-sensor camera system shall provide Auto or Manual exposure settings for adjusting the amount of light detected by the camera sensor.

19. IP Panoramic indoor/outdoor multi-sensor camera system shall provide user-selectable configurations for day/night auto mode. Transitional levels shall be used to set the desired light level for transitioning to night mode. Transition detect time shall control the length of time that the camera is exposed to a light level before changing to color or monochrome mode.

20. IP Panoramic indoor/outdoor multi-sensor camera system shall be factory focused, requiring no manual adjustment of focus in the field.

21. IP Panoramic indoor/outdoor multi-sensor camera system shall provide User and Group settings to assign permissions and access levels to the camera.

22. IP Panoramic indoor/outdoor multi-sensor camera system shall be based on a 1/3.2-inch high resolution CMOS sensor and includes four of them in the cameras standard configuration.

23. IP Panoramic indoor / outdoor network camera system shall include a camera module, back box, and lower dome.
24. IP Panoramic indoor/outdoor multi-sensor camera system shall support standard IT protocols.
25. IP Panoramic indoor/outdoor multi-sensor camera dome system shall provide a 1000Base-T network interface.
26. IP Panoramic indoor/outdoor multi-sensor camera system shall be plenum-rated in conformance with with 2008 NEC article 300.22(C)(2).
27. IP Panoramic indoor/outdoor multi-sensor camera system shall be vandal and tamper resistant with an impact resistance of IK10 (20 Joules).
28. IP Panoramic indoor/outdoor multi-sensor camera system shall be NEMA-4X, IP66 rated.
29. IP Panoramic indoor/outdoor multi-sensor camera system shall provide a 3/4-inch NPT conduit attachment on the side and top of the back box for in-ceiling and surface mounted applications.
30. IP Panoramic indoor/outdoor multi-sensor camera system shall attach to a standard (1900) 4-inch square box or standard 2-gang electrical box for surface mounted applications.
31. IP Panoramic indoor/outdoor multi-sensor camera system shall provide a 1.5-inch NPT conduit attachment for pendant mounted applications.
32. IP Panoramic indoor/outdoor multi-sensor camera system shall provide for a standards based HTML interface.
33. IP Panoramic indoor/outdoor multi-sensor camera system shall provide Window Blanking Technology for user defined privacy areas.
34. IP Panoramic indoor/outdoor multi-sensor camera system shall feature open architecture connectivity for third-party software recording solutions allowing integration into virtually any IP-based system. It is also compatible with Pelco VideoXpert and Digital Sentry® video management systems.
35. IP Panoramic indoor/outdoor multi-sensor camera system shall provide integrated video analytics with the ability to provide hardware and software alarms based on the analytic behaviors presented.

36. Pelco Analytics for IP Panoramic indoor/outdoor multi-sensor camera system shall include:

    a. Abandoned Object: Detects objects placed in a defined zone and triggers an alarm if the object remains in the zone longer than the user-defined time allows. An airport terminal is a typical installation for this behavior. This behavior can also detect objects left behind at an ATM, signaling possible card skimming.

    b. Adaptive Motion: Detects and tracks objects that enter a scene and then triggers an alarm when the objects enter a user-defined zone. This behavior is primarily used in outdoor environments with light traffic to reduce the number of false alarms caused by environmental changes.

    c. Camera Sabotage: Detects contrast changes in the field of view. An alarm is triggered if the lens is obstructed with spray paint, a cloth, or a lens cap. Any unauthorized repositioning of the camera also triggers an alarm.

    d. Directional Motion: Generates an alarm in a high traffic area when a person or object moves in a specified direction. Typical installations for this behavior include an airport gate or tunnel where cameras can detect objects moving in the opposite direction of the normal flow of traffic or an individual entering through an exit door.

    e. Loitering Detection: Identifies when people or vehicles remain in a defined zone longer than the user-defined time allows. This behavior is effective in real-time notification of suspicious behavior around ATMs, stairwells, and school grounds.

    f. Object Counting: Counts the number of objects that enter a defined zone or cross a tripwire. This behavior might be used to count the number of people at a store entrance/exit or inside a store where the traffic is light. This behavior is based on tracking and does not count people in a crowded setting.

    g. Object Removal: Triggers an alarm if an object is removed from a defined zone. This behavior is ideal for customers who want to detect the removal of high value objects, such as a painting from a wall or a statue from a pedestal.

h. Stopped Vehicle: Detects vehicles stopped near a sensitive area longer than the user-defined time allows. This behavior is ideal for airport curbside drop-offs, parking enforcement, suspicious parking, traffic lane breakdowns, and vehicles waiting at gates.

37. IP Panoramic indoor/outdoor multi-sensor camera system shall meet or exceed the following design and performance specifications.

a. Camera Specifications:

| | |
|---|---|
| Imaging Device | 1/3.2-inch |
| Imager Type | CMOS |
| Imager Readout | Progressive scan |
| Highest Resolution | 12 MP, 2048 x 1536 x 4 |
| Signal-to-Noise Ratio | greater than 50 db |
| Sensitivity: | |
| 180 degrees Model | f/2.0, 0.3 lux color (33 ms), 0.14 lux mono<br><br>(33 ms) |
| 270 degrees, 360 degrees Models | f/2.5, 0.5 lux color (33 ms), 0.2 lux mono (33 ms) |
| Day/Night Capabilities | Yes |
| Mechanical IR Cut Filter | Yes, (ON/OFF/AUTO selectable) with different set points |
| Wide Dynamic Range | 120 dB |

b. Lens Specifications:

| | |
|---|---|
| Length: | |
| 180 degrees Model | f/2.0 ~ 4.8 mm |
| 270 degrees, 360 degrees Models | f/2.5 ~ 2.7 mm |
| Field of View: | |
| 180 degrees Model | 180 degrees horizontal, 41 degrees vertical |
| 270 degrees Model | 270 degrees horizontal, 73 degrees vertical |
| 360 degrees Model | 360 degrees horizontal, 73 degrees vertical |

c. Video Specifications:

| | |
|---|---|
| Video Streams | Set of streams to deliver full resolution views; secondary stream that comprises a lower resolution mosaic of above streams |
| Frame Rate(s) | User selectable up to 12.5 frames per second (fps) |
| Video Encoding | H.264 High, Main, or Base profiles; MJPEG (mosaic stream only) |
| Bit Rate Control | Default maximum for Constrained Variable Rate (CVBR) at maximum resolution and frame rate |
| 180 degrees Model | 28 Mbps Note: Actual bit rates are lower depending on scene complexity |
| Network: | |
| Supported Protocols | TCP/IP, UDP/IP (Unicast, Multicast IGMP), UPnP, DNS, DHCP, RTP, RTSP, NTP, IPv4, IPv6, SNMP v2c/v3, QoS, HTTP, HTTPS, SSH, SSL, SMTP, FTP, ARP, ICMP, and+ IEEE 802.1x(EAP) Note: IPv6 supports mixed IPv4 and IPv6 installations, but not IPv6-only deployments |
| Users: | |
| Unicast | Up to 20 simultaneous depending on the resolution settings, and frame rate |
| Multicast | Unlimited H.264 |
| Security Access | Password protected |
| Software Interface | Web browser view and setup |
| Pelco System Integration | Pelco VideoXpert, Digital Sentry |
| Open API Integration | Pelco API, Panomersive SDK, ONVIF Profile S and G |
| Minimum System Requirements: | |
| Processor | Intel® Core™ i3 processor, 2.4 GHz |
| Operating System | Microsoft Windows® 10 (32- and 64-bit); or Mac OS X 10.9 (or later) |
| Memory | 4 GB RAM |
| Network Interface | 100 MBit (or greater) |

| | |
|---|---|
| Monitor | Minimum of 1024 x 768 resolution, 16- or 32-bit pixel color resolution |
| Web Browser | Microsoft Edge®; Mozilla Firefox® 35 (or later); Google® Chrome 40 (or later) |
| Analytics: | |
| Open API | Pelco API can transmit behavior alarm data to third-party applications, go to pdn.pelco.com |

d. Electrical Specifications:

| | |
|---|---|
| Network Port | RJ-45 connector for 1000Base-T1 Gigabit/sec Auto MDI/MDI-X PoE+; Class 4 |
| Cabling Type | Category 5 or better |
| Input Power | PoE+ (IEEE 802.3at, Class 4) |
| Power Consumption: | |
| Without Heater | 17 watts |
| With Heater | 23 watts |
| Local Storage | Micro SD, SDHC |
| Alarm: | |
| Unsupervised | Detects open or closed alarm state |
| Supervised | Detects open and short alarm state with external 1-kohm resistor to detect alarm tampering |
| Input | 3.5 VDC maximum, 3.5 mA maximum |
| Relay Output | ±32 VDC maximum, 150 mA maximum |
| Audio: | |
| Streaming | Bidirectional: full or half duplex |
| Input/Output | 600 ohm differential, 1Vp-p max. signal level |
| Compression | G.711 PCM 8 bit, 8 kHz mono at 64 kbit/s |

e. Back box and lower dome specifications:

| | |
|---|---|
| Indoor Vandal, In-Ceiling: | |
| Installation | Single back box for suspended or hard ceiling applications |
| Back Box | Plenum rated |

| | |
|---|---|
| Cable Entry | 0.75-inch NPT or 25 mm conduit attachments on side and top of back box |
| Operating Temperatures | minus 10 degrees to 50 degrees C (14 degrees to 122 degrees F) |
| Operating Humidity | 15 to 85 percent, RH non-condensing |
| Impact Resistance | IK10 |
| Shock and Vibration | EN50155 Category 1, Class B; IEC 60068:2-6 and 2-27, ISTA-2A, Sequence 5, MIL810G |
| Construction | Alodine aluminum |
| Indoor Vandal, Surface Mount: | |
| Installation | Attaches to standard 4-inch square outlet box and 2-gang electrical box; 0.75-inch NTP or 25 mm conduit attachments on side back box; wire entry through grommet on top of back box |
| Operating Temperatures | minus 10 degrees to 50 degrees C (14 degrees to 122 degrees F) |
| Operating Humidity | 15 to 85 percent, RH non-condensing |
| Impact Resistance | IK10 |
| Shock and Vibration | EN50155 Category 1, Class B; IEC 60068:2-6 and 2-27, ISTA-2A, Sequence 5, MIL810G |
| Construction | Alodine aluminum |
| Indoor Vandal, Pendant: | |
| Installation | 1.5-inch NPT conduit/pipe attachment |
| Operating Temperatures | minus 10 degrees to 50 degrees C (14 degrees to 122 degrees F) |
| Operating Humidity | 15 to 85 percent, RH non-condensing |
| Impact Resistance | IK10 |
| Shock and Vibration | EN50155 Category 1, Class B; IEC 60068:2-6 and 2-27, ISTA-2A, Sequence<br><br>5, MIL810G |
| Construction | Alodine aluminum |
| Environmental Vandal, In-Ceiling: | |

| | |
|---|---|
| Installation | Single back box for suspended or hard ceiling applications |
| Back Box | Plenum rated |
| Cable Entry | 0.75-inch NPT or 25 mm conduit attachments on side and top of back box |
| Operating Temperatures | minus 40 degrees to 50 degrees C (minus 40 degrees to 122 degrees F) |
| Operating Humidity | 10 to 95 percent, RH non-condensing |
| Impact Resistance | IK10 |
| Shock and Vibration | CEI EN 50155 Category 1, Class B; IEC 60068-2-6 and IEC 60068-2-27, ISTA-2A, Sequence 5, MIL810G |
| Construction | Alodine aluminum |
| Ingress | IP66 |
| Environmental Vandal, Surface Mount: | |
| Installation | Attaches to standard 4-inch square outlet box and 2-gang electrical box |
| Cable Entry | 0.75-inch NPT or 25 mm conduit attachments on side and top of back box. Wire entry through grommet on top of back box |
| Operating Temperatures | minus 40 degrees to 50 degrees C (minus 40 degrees to 122 degrees F) |
| Operating Humidity | 10 to 95 percent, RH condensing |
| Impact Resistance | IK10 |
| Shock and Vibration | CEI EN 50155 Category 1, Class B; IEC 60068-2-6 and IEC 60068-2-27, ISTA-2A, Sequence 5, MIL810G |
| Construction | Alodine aluminum |
| Ingress protection | IP66 |
| Environmental Vandal, Pendant: | |
| Installation | 1.5-inch NPT thread for use with Pelco wall mounts |
| Operating Temperatures | minus 40 degrees to 50 degrees C (minus 40 degrees to 122 degrees F) |
| Operating Humidity | 10 to 95 percent, RH condensing |
| Impact Resistance | IK10 |

| | |
|---|---|
| Shock and Vibration | CEI EN 50155 Category 1, Class B; IEC 60068-2-6 and IEC 60068-2-27, ISTA-2A, Sequence 5, MIL810G |
| Construction | Alodine aluminum |
| Ingress protection | IP66 |

f. Dome System Specifications:

| | |
|---|---|
| Indoor Vandal, In-Ceiling | 5.90 centimeter (CM) (2.32 in) above ceiling, lower dome 9.85 cm (3.88 in) below ceiling, 16.15 cm (6.36 in) diameter |
| Indoor Vandal, Surface Mount | 14.65 cm (5.76 in) overall length (including dome) by 15.93 cm (6.27 in) diameter |
| Indoor Vandal, Pendant | 17.80 cm (7.00 in) overall length (including dome) by 15.75 cm (6.20 in) diameter |
| Environmental Vandal, In-Ceiling | 5.90 cm (2.32 in) above ceiling, lower dome 9.85 cm (3.88 in) below ceiling,<br><br>16.15 cm (6.36 in) diameter |
| Environmental Vandal, Surface | 14.65 cm (5.76 in) overall length (including dome) by 15.93 cm (6.27 in) diameter |
| Environmental Vandal, Pendant | 17.80 cm (7.00 in) overall length (including dome) by 15.75 cm (6.20 in) diameter |

g. Mechanical Specifications:

| Dome Attenuation: | |
|---|---|
| Clear | f/0.0 light loss |
| Smoked | f/1.0 light loss |
| Pan Adjustable (All Models) | 370 degrees |
| Tilt Adjustable (180 Model) | 0 degrees - 180 degrees |

h. General Specifications:

| Unit Weight: | |
|---|---|
| In-Ceiling | 1.5 kg (3.3 lb) |

| | |
|---|---|
| Surface Mount | 1.7 kg (3.9 lb) |
| Pendant Mount | 1.7 kg (3.9 lb) |

F. Warranty:

1. 36-months, parts and labor:

a. Certifications/Ratings:

1) CE, Class A

2) FCC, Class A

3) UL/cUL Listed

4) ICES, Class A

5) KCC

6) C-Tick

7) CB Scheme ITE

8) NEMA Type 4X, and IP66 rating (Environmental Vandal)

9) RoHS, Lead Free, REACH

10) MTBF = 200,000 POH (Reporting standard is RELEX Modeling)

b. Pelco Model Numbers:

| | |
|---|---|
| IMM12018-xxx Series | 180 degrees indoor/outdoor panoramic IP camera, 12 MPx |
| IMM12027-xxx Series | 270 degrees indoor/outdoor panoramic IP camera, 12 MPx |
| IMM12036-xxx Series | 360 degrees indoor/outdoor panoramic IP camera, 12 MPx |

2.5 ACCESSORIES

A. Refer to 600 VOLT OR LESS RATED WIRING SYSTEM for video conductors and cables.

2.6 ADDITIONAL FEATURES

A. Alarm: The network camera system shall have one alarm/sensor inputs and a relay output for alarm or control.

1. The alarm input shall be able to detect an open or closed alarm state function in unsupervised modes.

2. Relay Output: plus or minus 350 VDC maximum, plus or minus 130 mA maximum

B. Audio: The network camera system shall have bi-directional audio capability.

1. Input/Output

2. Encoding: G.711 PCM 8 bit, 8 kHz mono at 64 kbit/s

C. Discovery: Manufacturer shall offer a discovery program to identify devices manufactured on the network.

D. System Information:

1. The system settings of the network camera system shall be exportable as a separate file.

2. The network camera system shall maintain an accessible log of system and motion-triggered events.

2.7 NETWORK

A. Connectivity: 100 BASE-TX Ethernet with RJ-45 connector

B. Protocols Supported:

1. Transmission Control Protocol (TCP), Internet Protocol (IP) v4 and v6, User Datagram Protocol (UDP)

2. Configuration: Dynamic Host Configuration Protocol (DHCP)

3. Web services: Hypertext Transfer Protocol (HTTP), Secure HTTP (HTTPS)

4. Network services: Domain Name System (DNS), Network Time Protocol (NTP), Internet Control Message Protocol (ICMP), Simple Network Management Protocol (SNMP) v2c/v3, Universal Plug and Play (UPnP)

5. Media: Real-Time Transport Protocol (RTP), Real-Time Streaming Protocol (RTSP)

6. Multicast: Internet Group Management Protocol (IGMP)

7. Notifications: File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP)

8. Remote Access: Secure Shell (SSH)

9. Security: Secure Sockets Layer (SSL), IEEE 802.1x (EAP-MD5, EAP-TLS, EAP-TTLS, EAP-PEAP and EAP-FAST)

10. Quality of Service: IEEE 802.1p Layer 3 Differentiated Services Code Point (DSCP)

11. DDNS: The network camera system shall support DDNS services offered by the manufacturer and other publicly available service offerings. (DNS)

C. Security:

1. The network camera system shall support IP address filtering whereby users can enter a list of allowed or blocked IP addresses for viewing video and configuring camera settings

2. The network camera system shall provide three levels of user access with password protection.

2.8 CAMERA SOFTWARE

A. The network camera system shall have a built-in web server which supports browser-based configuration.

B. The camera’s web server shall allow access to camera information and primary software functions.

C. The camera software shall have video viewer and configuration to implement the following actions:

1. Camera discovery

2. Live Video:
    a. Video stream selection
    b. Video stream configuration
        1) Use preset video setting configurations
        2) Configure custom video setting configurations
            a) compression type
            b) resolution
            c) image rate
            d) I-frame interval
            e) H.264 profile
            f) Image quality
            g) Bit rate control
        3) Multicast
        4) Unicast
        5) JPEG frame rate
    c. Maximize view area of video to full size of browser:
        1) Revert to normal view
    d. Open stream in new window
    e. Capture and save image as .jpg file
    f. Resize viewing area
3. Image Settings:
    a. Image quality
    b. Exposure
    c. Focus
    d. White balance

e. Window blanking

f. Digital zoom

g. Lighting mode

h. Video noise reduction

i. Digital processing (color and detail adjustment):

1) Image enhancement

2) Quick setup preset modes

3) Sharpness

4) Saturation

5) Contrast

6) Brightness

j. Exposure modes

4. Recording:

a. Initiate instant record and playback

b. Manage SD card storage

5. Events:

a. Configure event sources:

1) External alarm events

2) Analytic events

b. E-mail setup

c. Define ftp/e-mail addresses for notifications

6. Camera network settings

7. System:

a. Firmware upgrade

b. Reset to factory default

c. Set date, time, and NTP server synchronization

d. User access control

e. View and export camera settings

f. View system logs

D. Acceptable Web Browsers:

1. Microsoft® Edge® (or later)

2. Google® Chrome™ 51 and later

3. Apple® Safari® 7.0.6

4. Mozilla® Firefox® 3.5 9 (or later)

E. Manufacturer shall offer a mobile application with the capability to access live video from up to 500 cameras.

F. Manufacturer shall support integrations as follows:

| | |
|---|---|
| Video Management | VideoXpert™; Endura® 2.0 (or later); Digital Sentry® 7.3 (or later); Third-party system through Pelco API/SDK, ONVIF Profile S, ONVIF Profile G, ONVIF Profile Q |
| Mobile Application | Pelco Mobile |

2.9 ELECTRICAL

A. Power:

1. Source Options:

a. 24 VAC

b. PoE Class 3

c. 18 to 32 VAC range, 12 VDC

2. Power Consumption: less than16 W (with heater ring)

B. Connectors:

1. Ethernet: RJ-45 connector

2. External power: 2-conductor power to terminal block

2.10 MECHANICAL AND ENVIRONMENTAL

A. Construction Material: Aluminum base and plastic sun shield

B. Finish: RAL 9003 (indoor models), RAL 7047 (outdoor models)

C. Impact Resistance: IK10 (20J)

D. Dimensions (D by H): 23.41 centimeters (cm) (9.22 in) by 11.92 cm (4.69 inch (in))

E. Temperature:

| | |
|---|---|
| Operating: | minus 10 degrees Centigrade (C) to 55 degrees C (14 degrees Fahrenheit (F) to 131 degrees F) (indoor models) minus 40 degrees C to 55 degrees C (minus 40 degrees F to 131 degrees F) (outdoor models) |
| Storage: | minus 40 degrees C to 60 degrees C (minus 40 degrees F to 140 degrees F) (indoor and outdoor models) |

F. Ingress Protection: IP66

2.11 CERTIFICATIONS

A. CE - CEI EN 55022 (Class A), EN 50130-4, EN 60950-1

B. FCC (Class A) - 47 CFR 15

C. UL and cUL Listed - UL 60950-1, CSA C22.2 No. 60950-1-07

D. ICES-003 (Class A)

E. RCM

F. KC

G. RoHS

H. ONVIF Profile S, Profile G, and Profile Q conformant

1. Meets Type 4X (environmental models only), IP66 and IK10 ratings

PART 3 - EXECUTION

3.1 PREPARATION

A. Investigate Project Site and become thoroughly familiar with the facility.

B. Plan the automated video surveillance system installation such that the automated video surveillance system installation is concurrent with the digital video recording system installation.

C. Camera locations require approval prior to installation.

D. Comply with applicable governmental regulations regarding radio frequency transmissions and interference, including FCC and FAA.

E. Exterior infrastructure and equipment designs shall be stamped and signed by a State of California professional engineer and stated as 80 miles per hour (mph) wind-rated.

F. The network design and configuration shall be verified for compatibility and performance with the camera(s).

G. Network configuration shall be tested and qualified by Contractor prior to camera installation.

3.2 INSTALLATION

A. Comply with applicable state and local licensing requirements.

B. Contractor's main resources within Project shall carry proper professional certification issued by the manufacturer and verified by a third party organization to confirm sufficient product and technology knowledge.

C. Carefully follow instructions in documentation provided by the manufacturer to ensure steps have been taken to provide a reliable, easy-to-operate system.

D. Equipment shall be tested and configured in conformance with instructions provided by the manufacturer prior to installation.

E. Firmware found in products shall be the latest and most up-to-date provided by the manufacturer, or of a version as specified by the provider of the Video Management Application (VMA) or Network Video Recorder (NVR).

F. Equipment requiring users to log on using a password shall be configured with user/site-specific password/passwords. No system/product default passwords shall be allowed.

G. A proper installation shall meet National Electrical Code (NEC) per the guidelines of that year’s revision. When properly installed equipment meets Low Voltage, Class 2 classification of NEC.

H. Install in conformance with manufacturer's written instructions.

I. Identification: Install permanent identification labels on conduits, junction boxes, conductors, and termination blocks.

J. Exterior equipment to sustain 80 mph winds and indicate Compliance in Proposal and Submittals.

K. Installation with minimal disruption of Department Operations. Installation and pre-installation activities shall be coordinated with Engineer and the affected Department tenants.

L. Be fully responsible for any damage(s) caused by Work and shall repair damage(s) including utilities and railroad related infrastructure and equipment at no additional cost to Department.

M. Specific Scopes of Work:

1. Open Areas, Pathways, and Parking Lots

a. Provide fixed, PTZ, and or 360 degree HD/IP cameras at locations as shown on Drawings.

b. Provide field of view as shown on Drawings and identified in Specifications.

c. Position cameras such that any camera view obstructed (for example, by camera pole) is compensated by another camera view.

d. At parking lot locations, provide at least one camera field of view that captures vehicle entrance and exit.

e. Procure, provide, install, and make fully operational new fixed PTZ, and or 360 degree HD/IP cameras which meet or exceed Specifications.

f. Program surveillance system to back up cameras on back-up storage system.

2. Restroom Building:

    a. Install and make fully operational headend equipment in secure, clean, and climate controlled room (include maintenance station).

    b. Connect the headend system to power and data network. Test connectivity of fiber and power capacity before installing any equipment.

    c. Coordinate with Port Police and provide connectivity to their network.

3. Power and Data Network

    a. Install and make fully operational power and data network in conformance with Drawings and Specifications.

N. Before permanent installation of the system, Contractor shall test the system in conditions simulating the final installed environment

1. A report indicating successful test results shall be produced.

O. Contractor shall follow manufacturer-published guidance on proper installation and configuration of the camera.

3.3 STORAGE

A. The dome camera hardware shall be stored in an environment where temperature and humidity are in the range specified by the manufacturer.

3.4 FIELD QUALITY CONTROL

A. Safety coordination in conformance with city, state, and federal requirements.

3.5 ADJUSTING

A. Cameras shall be installed as to be facing the direction indicated on the Drawings.

B. Field Of View Adjustment: Aim each CCTV camera for the optimum view of the area that the automated video surveillance is intended to cover, using a monitor to view the camera output. Final aiming shall be approved and accepted by Engineer.

C. Touch Up Work: Touch-up scratched and marred surfaces to match original finishes; remove dirt and construction debris.

## 3.6 CLOSEOUT ACTIVITIES

A. Demonstrate system operation and provide two hours of instruction with manufacturer's training personnel.

B. Conduct walking tour of Project and briefly describe function, operation, and maintenance of each component.

C. System Testing and Acceptance: Upon installation of each camera perform an installation test meeting the following requirements:

1. The installation test shall include confirmation of the field of view as scheduled and shown on the Drawings and verification that video is being injected into the backbone fibers as specified. Test junctions from the input device to system output.

2. Any problems encountered, including damage to Department equipment and CCTV elements during this test, shall be documented and brought to Port's attention and corrected at Contractor's sole cost and expense. Promptly correct problems encountered, providing field service personnel appropriately trained for the types of problems encountered.

3. Supply a form to be used during these tests for authorization and initialing by Engineer and Contractor.

a. This form shall clearly define the items tested, leaving room for the date, automated video surveillance element designation, confirmation of field of view, and initials.

b. Automated video surveillance functions shall be demonstrated to ensure operation as required by the Specifications and Drawings.

D. Acceptance shall be withheld until the successful completion of the following:

1. Acceptance of submittals.

2. Delivery of final documentation.

3. Camera aiming and approval.

4. System programming.

5. Successful testing.

6. Successful demonstration and training, including verification of proper operation to meet specified performance criteria for cameras and image stabilizers

3.7 TRAINING

A. Provide documentation highlighting changes to the system. Documentation shall include, but not be limited to, operations manuals for any new equipment installed and as-built drawings showing changes to the existing system.

B. Provide 2 hours of user training on any new hardware installed as a portion of this Contract.

C. Provide 2 hours of maintenance training on any new hardware installed as a portion of this Contract.

D. Provide 8 hours of user training on any new software installed as a portion of this Contract.

E. Provide 4 hours of administrator training on any new software installed as a portion of this Contract.

3.8 OPERATION AND MAINTENANCE DATA

A. The intent of this Article is to require complete documentation of this system for the purpose of system operation and maintenance during and after the warranty period. It is intended that the drawing books and operation and maintenance manuals be exhaustive in the coverage of the system to the extent that they may be used as the sole guide to the trouble shooting, identification and repair of defective parts, adjustments, and operation.

1. Content: Manufacturer's standard literature, covering equipment included as a part of Project. Literature shall contain specifications, management procedures, component location diagrams, and replacement parts identification. References to equipment not supplied on this Project shall be crossed out.

2. Special tools and test equipment list covering the tools and equipment required to maintain and test the system. List shall include the part name, number and source (including address and telephone number) for special tools.

B. Drawing books: The drawing books shall contain basic wiring diagrams, schematics, and functional details. It is required that everything in the system be neatly labeled and easily identifiable. Include the following drawings as a minimum:

1. Block Diagram: Provide an overall block diagram showing the interconnection of major system components.

2. Arrangement Drawings: Provide drawings showing the physical arrangement of major system components. Components shown in the block diagrams shall be clearly identified in such a manner as to be easily correlated with the actual field components.

3. Wiring Diagrams: Provide wiring diagrams showing field installed interconnecting wiring. Wiring identification on the diagrams shall agree with the wire markers installed on the equipment.

3.9 MAINTENANCE

A. Provide a separate maintenance contract for specified maintenance service.

B. Provide service and maintenance of system for 1 year from Final Acceptance.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Installation and documentation of equipment, fiber optic/power network, integration/licensing/communication with law enforcement, training, and Performance Verification Testing (PVT) for an Electronic Safety Alert System (ESAS).

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables

C. Section 26 05 34 - Outlet, Junction, and Pull Boxes

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

B. ASTM D523 - Standard Test Method for Specular Gloss.

C. ASTM D714 - Standard Test Method for Evaluating Degree of Blistering of Paints.

D. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

E. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

F. ASTM D3359 - Standard Test Methods for Rating Adhesion by Tape Test.

G. IEEE 802.3 - IEEE Standard for Ethernet.

H. NFPA 72 - National Fire Alarm and Signaling Code.

I. UL 2017 - UL Standard for Safety General-Purpose Signaling Devices and Systems.

J. UL 60950-1 - Information Technology Equipment – Safety – Part 1: General Requirements.

1.5 ACRONYMS

| | |
|---|---|
| AGC | Automatic Gain Control |
| API | Applications Programming Interface |
| API/SDK | Application Programming Interface/Software Development Kit |
| ARP | Address Resolution Protocol |
| AWB | Automatic White Balance |
| BLC | Back Light Compensation |
| CBR | Constant Bit Rate |
| CCD | Charge Coupled Device |
| CSM | Client Software Modules |
| CVBR | Constant and Variable Bit Rate |
| DHCP | Dynamic Host Configuration Protocol |
| DNR | Digital Noise Reduction |
| DNS | Domain Name Server |
| DVRMS | Digital Video Recording & Management System |
| EAP | Extensible Authentication Protocol |
| EO/IR | Electro-Optical/Infrared |
| FOC | Fiber Optic Cable |
| fps | frames per second |
| FTP | File Transfer Protocol |
| GUI | Graphical User Interface |
| HTTP | Hypertext Transfer Protocol |
| HTTPS | Secure Hypertext Transfer Protocol |
| ICMP | Internet Control Message Protocol |
| IGMP | Internet Group Management Protocol |
| IP | Internet Protocol |
| IF | Infrared |
| IVA | Intelligent Video Analytics |
| JPEG | Joint Photographic Experts Group |
| LAN/WAN | Local Area Network/Wide Area Network |
| LDAP | Lightweight Directory Access Protocol |
| MJPEG | Motion JPEG |

| | |
|---|---|
| MM | Multi-mode Fiber Optic Cable |
| MPEG | Moving Pictures Experts Group |
| NTP | Network Transfer Protocol |
| NTP | Network Time Protocol |
| NTSC | National Television System Committee |
| NVR | Network Video Recorder |
| PoE | Power over Ethernet |
| PPPoE | Point-to-Point Protocol over Ethernet |
| PTZ | Pan, Tilt, Zoom |
| QoS | Quality of Service |
| RTP | Real-Time Transport Protocol |
| RTSP | Real-Time Streaming Protocol |
| SM | Single Mode Fiber Optic Cable |
| SMTP | Simple Mail Transfer Protocol |
| SNMP | Simple Network Management Protocol |
| SSH | Secure Shell |
| SSL | Secure Sockets Layer |
| SSM | Server Software Modules |
| TCP | Transmission Control Protocol |
| TCP/IP | Transmission Control Protocol / Internet Protocol |
| TWIC | Transportation Workers Identification Card |
| UDP | User Datagram Protocol |
| UPnP | Universal Plug and Play |
| VBR | Variable Bit Rate |
| VMS | Video Management System |
| WDR | Wide Dynamic Range |

1.6 SUBMITTALS

A. Shop Drawings: Indicate electrical characteristics and connection requirements, including system wiring diagram.

B. Product Data: Provide showing electrical and mechanical characteristics and connection requirements for each component. Provide an original manufacturers data sheet for each individual product. Where the data sheet reflects a range of products, the specific product utilized shall be indicated.

C. Manufacturer's Written Instructions for Installation: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

D. Performance Verification Testing (PVT) Procedures and Reports: Submit plan indicating PVT methods, testing device calibration, and interpretations of test results for Field Acceptance Tests.

1. Submit PVT plan at least 20 days prior to the scheduled start of the first test. The test plan shall detail the objectives of all tests.

2. Tests shall clearly demonstrate that the video surveillance system installations performed by Contractor fully comply with the performance requirements specified.

3. Progress payments shall depend upon the successful completion of testing and documentation.

E. Training Materials: Submit training documentation required under Training Article of this Section.

F. Project Record Documents: Record actual locations of new and relocated cameras and routing of any and new cabling.

G. Operation and Maintenance Data: Include routine trouble shooting procedures and instructions for new equipment installed as a part of this Contract.

H. Warranty documentation

1.7 QUALITY ASSURANCE

A. Conform to requirements of any and all standards of workmanship.

B. Products: Furnish products listed and classified by Underwriters Laboratories Inc., Tories Inc., or International Organization for Standardization (ISO), as suitable for purpose specified and indicated.

C. Equipment and materials used shall be standard components that are manufactured and available for purchase as standard replacement parts as long as the product is commercially available from the manufacturer.

D. Manufactured products shall be thoroughly tested and proven in actual use.

E. Manufactured products shall include, at no additional cost, online support services and availability of a toll-free (U.S. and Canada), 24-hour technical assistance program (TAP) for emergencies.

1.8 QUALIFICATIONS

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum 5 years documented experience and with service facilities within 500 miles of Project.

1. A minimum of 2 fully operational and commissioned sites are required utilizing the same version of hardware and software proposed for this facility.

2. Manufacturer shall have a minimum of 7 years experience in producing IP video equipment.

3. Contractor shall provide references for sites required by Paragraph B of this Article including facility name, types of hardware and software installed, commissioning date, and facility contact person.

4. Installers shall be trained and authorized by the manufacturer to install, integrate, test, and commission the system.

B. Verification of reference systems operation is a requirement for award.

C. Key Personnel Qualifications: Authorized installer of specified manufacturer with service facilities within 500 miles of Project.

1. Key personnel shall possess at least 2 years of successful installation experience with projects utilizing High Definition IP Base CCTV systems, Image Stabilization, Video Systems, LAN/WAN, integration with existing systems, and wireless work similar to that required for this Project.

2. Key Personnel including Project Manager, Project Engineer, and Lead Installer shall provide information as to project experience.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver the camera in the manufacturer’s original, unopened, undamaged container with identification labels intact.

B. Store the camera in a temperature environment protected from mechanical and environmental conditions as designated by the manufacturer.

1.10 WARRANTY AND SUPPORT

A. The emergency phone tower shall be warrantied against any defects in material and workmanship, under normal use, for a period of 32 years from date of installation. If system is found by manufacturer to be defective within the warranty period, manufacturer shall repair and replace any defective parts, provided the equipment is returned to manufacturer.

B. Manufacturer shall provide options to extend the warranty by up to 5 years at the time of initial purchase.

C. Period: Contractor shall warrant labor, workmanship, and materials for a period of 1 year from the date of Final Acceptance. Should a failure occur within this 1 year to the system, provide labor and materials necessary to restore the system to the condition required for the final test and acceptance for Contract, at no cost to Department.

1. Offer an “Optional 1 Year Extended Warranty” package renewable for up to 3 years to Department. Department shall inform Contractor of the acceptance or rejection of the first year of the package prior to the expiration of the warranty period as noted above. Provide a price for each year individually and this shall be available to Department. Contractor shall notify Engineer in writing 2 months prior to warranty expiration to determine the status of the optional 1 year warranty.

2. System Add, Changes, or Moves: During the warranty period, additional cameras and other equipment may be connected to the system and some cameras may be relocated or removed. Neither the installation of any new cameras, the connection of any new equipment nor the relocation/removal of any existing cameras shall void this warranty.

PART 2 - PRODUCTS

2.1 SYSTEM

A. ESAS shall consist of new infrastructure and equipment, and all associated encoders, enclosures, mounts, power supplies, cabling, and any other associated or required part required for full system functionality. These shall be installed at various locations and connected back to the video management system by existing infrastructure or Contractor provided infrastructure as shown on Drawings.

B. Contractor shall be responsible for installing equipment which meet or exceed the performance specifications in this Section, which Contractor shall procure, install, and make fully operational. Contractor shall test cameras for satisfactory functionality and as described in the scope of Work.

C. The manufacturer shall repair or replace without charge, manufactured products proven defective in material or workmanship for the stated warranty period from the date of shipment.

2.2 SYSTEM DESCRIPTION

A. The new ESAS within Project boundaries provides emergency-related communications of various areas which are of security and operational interest to Department. Department has determined that there are functional requirements for the system, including mounting locations which are subject viewing large public gathering areas, parking lots, public pathways, and semi-isolated areas, as well as areas which could benefit from enhanced coverage. Department intends to address public safety surveillance through the following project objectives:

1. Providing and installing new ESAS infrastructure and equipment at various points as shown on Project Drawings and as described in site specific scopes of Work.

2. Providing and installing new fiber optic and power network to support ESAS as shown on Drawings and as described in site specific scopes of Work.

3. Integration, programming and licensing of new ESAS that communicates with local law enforcement systems as described in site specific scopes of Work.

4. Installing emergency phone tower and manufacturer's recommended dome and pinhole cameras.

2.3 BASIC EQUIPMENT CAPABILITIES

A. List of pertinent conceptual layout drawings (separate documentation). Note - RFP drawings are conceptual only and are provided for basic information to support the RFP.

## 2.4 PRODUCT PERFORMANCE SPECIFICATIONS

A. Exterior Rated vandal-resistant ESAS. Emergency Phone Tower shall be Code Blue, Model #CB-1, and shall have the following capabilities at a minimum:

1. The unit shall be a vandal-resistant communications device that is a multi-functional, freestanding pedestal constructed of carbon steel, model CB 1 from Code Blue Corporation. It shall include a high quality, hands-free communications device illuminated by a high intensity faceplate light, a powerful combination blue beacon/strobe light, and an area light that serves to easily identify it from a distance.

2. The Emergency Phone Tower shall be rectangular in appearance and made of continuous steel construction. It shall stand 9 feet from the base to the top of tower. The word “EMERGENCY” with bright reflective lettering shall be located on all four sides and each letter shall be a minimum of 3 inches in height. The phone shall be compliant with American with Disabilities Act (ADA).

3. The phone mechanism shall have the ability to be programmed with up to 5 emergency phone numbers. Upon activation of the emergency push button; a call shall be automatically placed, the strobe shall instantaneously flash until the call has been disconnected by the called party.

4. The Emergency Phone Tower shall include overhead camera mount, overhead PTZ camera, and pinhole camera. Overhead camera to be mounted such that Emergency Phone Tower lighting shall not interfere with viewing capability.

5. The Emergency Phone Tower lighting, phone, recording, and camera capability shall be compatible with Port Police systems in order to provide fully functional Emergency Phone Tower operations.

B. Construction:

1. The unit shall be a cylinder constructed of ASTM A500/A500M seamless carbon steel structural tube, schedule 20, 12.75-inch outside diameter x 0.25-inch thick wall, at a height of 108 inches and weigh approximately 330 pounds.

2. The unit shall have an internal anchor base plate that is MIG welded 2 inches above the base and fabricated with a minimum of 0.50-inch thick A-36 grade steel plate. It shall have a 5-inch diameter center hole for electrical conduit access. The base plate shall have four oblong holes on an 8-inch circular bolt pattern for attachment.

3. An access door measuring 14 inches high by 9.64 inches wide shall be placed 10.94 inches from the bottom of the base to provide access for mounting to the anchor bolts and connectivity to electrical facilities. The opening shall have a cover plate, which mounts flush and is the same steel and radius as the unit. The cover plate shall fit into the opening and have a weather-resistant gasket. The cover plate shall be held in place by two 1/4-20 x 1-inch countersunk proprietary fasteners.

4. The emergency phone button shall be located approximately 48 inches above the base to ensure conformance with ADA requirements.

5. Tower shall have a Braille faceplate stating ‘EMERGENCY PHONE’ ‘PUSH FOR HELP’ to ensure conformance with ADA requirements.

6. Tamper resistant fasteners manufactured for Code Blue Corporation, or approved alternate, shall be used.

7. Two area light openings 10 inches high and 17 inches wide with 153 degrees of arc each shall be cut opposite each other, with the bottom of the openings approximately 14 inches from the top.

    a. The opening shall be enclosed by a 7 gauge steel plate with a single opening for a communication device.

8. The strobe electronics access opening shall be 7-1/4 inches high and 6-3/4 inches wide and located on the back of the tower.

9. Phone electronics and most electrical connections shall be housed in a NEMA 4 enclosure within the tower.

C. Mounting:

1. The unit shall be mounted onto four anchor bolts that are set 0.50 inches above the concrete. Standard 0.75-inch by 24-inch galvanized steel anchor bolts, nuts, and washers shall be supplied.

2. The concrete foundation shall measure 24 inches by 24 inches minimum and the anchor bolts shall protrude 6 inches from the foundation.

3. Unit shall include a weather-resistant, vented rubberized gasket mounted into the base to prevent entry of sediment and pests.

D. Electrical:

1. Electrical components shall have a modular plug for easy service and replacement, and shall be equipped with a fuse for protection from transient voltage conditions.

2. Requires 2.5 ampere at 24V AC.

3. Voltage options shall include: 12-24V AC/DC; 120, 240, 277 and 347V AC.

4. The unit shall have the option for Power over Ethernet for connectivity to a VoIP network switch with IEEE 802.3af or IEEE 802.3at (minimum) capabilities. Requires the IP5000 phone for connectivity to ToolVox or SIP/IAX2 compatible VoIP system.

E. Lights:

1. LED Beacon/Strobe: Located in the dome top assembly with a rating of no less than 270 Lumens/92 candela, it shall have a factory-set flash rate of up to 375 flashes per minute and be programmable. A deep blue

   a. UV-rated polycarbonate prismatic refractor shall surround LED Beacon/Strobe and be used to distribute the light in a horizontal pattern for maximum brightness and visibility.

   b. The communication device shall be factory programmed to activate LED Beacon/Strobe for the duration of a call.

   c. LED Beacon/Strobe shall be 5.10 inches tall and 5.50 inches in diameter

2. Area Light: LED Area Light shall be protected within the two light openings by a 0.13-inch thick UV-rated polycarbonate lens and be used to distribute light in a horizontal and vertical pattern.

   a. A reflector disk shall be mounted above to direct light outward and downward.

   b. It shall measure 17 inches wide by 10 inches high, with the opening 14 inches from the top and an arc of 153 degrees.

   c. It shall have a Lumen rating of 852.

3. Faceplate light: LED shall direct light onto the communications device and be vandal resistant.

    a. The opening shall measure 4.50 inches wise by .50 inches high.

    b. The light shall have a lifetime of 100,000 hours and a rating of 100 Lumens.

4. A Photocell shall be offered as an option to allow for the deactivation of the beacon during daylight hours.

5. A single element strobe shall be offered as an option. The strobe shall be activated upon pushing of the emergency phone button.

6. Strobes shall also be available in custom colors.

F. Communications:

1. The unit shall have an ADA compliant and vandal resistant speaker phone.

2. The phone shall be a push once to talk phone. Once the button has been pushed, the phone shall call programmed emergency numbers. The phone shall be capable of being programmed with up to 5 emergency numbers.

3. The phone shall have Location Message capability. Phone shall have a minimum 18 second recordable message capability programmable to either play once, twice, or continuously until * is pressed by called party. Phone shall notify called party of the location of the call upon being received at the emergency dispatch center.

4. Phone shall be capable of allowing the called party to replay the phone location message if necessary to ensure an understanding of the location of phone tower.

5. Once call has been made (button pushed), the call can only be terminated by the called party.

6. Phone plate shall have a red LED that shall light up upon push of the button. The light shall be a solid color when the phone is activated and shall flash when call has been answered.

7. The speakerphone shall be capable of being programmed and reprogrammed on-site and remotely.

8. The unit shall be capable of communicating via third party IP wireless and cellular devices, which can be housed within the unit.
9. Standard Phone Features:
    a. Programmable with up to 5 emergency phone numbers
    b. Weatherproof speaker
    c. Weatherproof microphone
    d. Operating Temperature of between minus 40 degrees Fahrenheit to plus 150 degrees Fahrenheit (minus 40 degrees Celsius to plus 65 degrees Celsius.
    e. Programmable passwords
    f. On-Site or Remote Programmable
    g. EEPROM memory to protect programming
    h. Adjustable speaker and microphones levels
    i. Programmable location message with human voice recognition
    j. Programmable conversation time
    k. 2 Button, 2 Number capability
    l. Remote and on-site diagnostic testing
    m. Ability to control additional accessories (cameras, speakers)
    n. Electronic Industries Alliance/Telecommunications Industry Association (EIA/TIA), American National Standards Institute (ANSI), and Building Industry Consulting Service International (BICSI) cabling or similar standards shall be adhered to for proper operation of devices connected to copper or fiber infrastructure

G. Finish:

1. Unit shall be UV resistant.

2. Four-coat paint process, with zinc-rich primer for corrosion resistance and baked-on polyurethane enamel for maximum gloss and shine.

    a. Optional clear coating process available to provide additional environmental protection.

3. Substrate preparation shall be as required to comply with applicable American Society for Testing and Materials (ASTM International) impact and adhesion standards: ASTM D2794 D2794 Direct and Reverse Impact, ASTM D523 Gloss at 60 Degrees, ASTM D3359 Cross hatch Adhesion, ASTM D1654 Corrosion Creep, ASTM D714 Scribe Blisters and Field Blisters.

4. The finish shall be available in 12 standard colors: Safety Blue, Safety Red, Safety Yellow, Midnight Blue, Gloss White, Gloss Black, Medium Bronze, Dark Bronze, British Racing Green, Cardinal Red, Bright Silver and Tiger Orange. Custom colors shall be available.

5. Minimum coverage thickness of 2.0 mils.

H. Graphics:

1. Engineering grade reflective vinyl for high visibility and legibility.

2. Standard 3.25 inches tall and 30 inches long graphics text offerings: Emergency, Assistance, Security, Courtesy, Police, Information or Help Point.

3. Standard graphics color offerings: Reflective White, Reflective Blue, Reflective Black, Reflective Green, Reflective Red and Reflective Yellow.

4. Custom text, length, and color options shall be available.

I. Options:

1. Active Vent Solar Powered Fan for improved air flow.

2. Overhead Camera Mount

3. 360 degree Public Address Speakers.

4. Second opening for directory listings, camera, card reader or other mounted device.

5. Temperature-controlled compartment capable of housing an AED device.

    a. Stainless steel housing shall be factory installed with dimensions of 12 inches wide by 21.42 inches high by 8.62 inches deep.

    b. The communication device shall be factory programmed to activate AED door remotely.

    c. Two pre-programmed key fobs shall be provided for activating tAED door wirelessly within 50 feet.

6. NightCharge® power system.

7. Mounting rings for housing and mounting third party security and communication products.

J. Compliance:

1. ADA

2. UL 60950-1 and UL 2017 listed

3. NFPA 72 Chapter 24 (2010) compliant

4. Meets NEMA 4X and IP56 requirement

2.5 ACCESSORIES

A. Refer to LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES Section, for video conductors and cables.

PART 3 - EXECUTION

3.1 CLOSEOUT ACTIVITIES

A. Demonstrate system operation and provide 2 hours of instruction with manufacturer's training personnel.

B. Conduct walking tour of Project and briefly describe function, operation, and maintenance of each component.

C. System Testing and Acceptance: Upon installation of each Emergency Phone Tower and associated camera, perform an installation test meeting the following requirements:

1. The installation test shall include confirmation of emergency communications operations and camera field of view as scheduled and shown on the Drawings and verification that video is being injected into the backbone fibers as specified. Test at all junctions from the input device to system output.

2. Any problems encountered, including damage to Department equipment, communications, and CCTV elements during this test, shall be documented and brought to Engineer's attention and corrected at Contractor's sole cost and expense. Promptly correct problems encountered, providing field service personnel appropriately trained for the types of problems encountered.

3. Supply a form to be used during these tests for authorization and initialing by Engineer and Contractor.

    a. This form shall clearly define the items tested, leaving room for the date, automated video surveillance element designation, confirmation of communications, and camera field of view, and initials.

    b. Automated video surveillance functions shall be demonstrated to ensure operation as required by Specifications and Drawings.

D. Acceptance shall be withheld until the successful completion of the following:

1. Approval of submittals.

2. Delivery of final documentation (Shop Drawings, Product Data, Manufacturer’s Written Instructions for Installation, Training Materials, Record Drawings, Operation and Maintenance Data).

3. Camera aiming and approval.

4. System programming.

5. Successful testing.

6. Successful demonstration and training, including verification of proper operation to meet specified performance criteria for cameras and image stabilizers

3.2 TRAINING

A. Provide documentation highlighting changes to the system. Documentation shall include, but not be limited to, operations manuals for any new equipment installed and as-built drawings showing changes to the existing system.

B. Provide 2 hours of user training on any new hardware installed as a portion of Contract.

C. Provide 2 hours of maintenance training on any new hardware installed as a portion of Contract.

D. Provide 8 hours of user training on any new software installed as a portion of Contract.

E. Provide 4 hours of administrator training on any new software installed as a portion of Contract.

3.3 OPERATION AND MAINTENANCE DATA

A. The intent of this Article is to require complete documentation of this system for the purpose of system operation and maintenance during and after the warranty period. It is intended that the drawing books and operation and maintenance manuals be exhaustive in the coverage of the system to the extent that they may be used as the sole guide to the trouble shooting, identification and repair of defective parts, adjustments, and operation.

1. Content: Manufacturer's standard literature, covering all equipment included as a part of Project. Literature shall contain specifications, management procedures, component location diagrams, and replacement parts identification. References to equipment not supplied on Project shall be crossed out.

2. Special tools and test equipment list covering the tools and equipment required to maintain and test the system. List shall include the part name, number and source (including address and telephone number) for special tools.

B. Drawing books: The drawing books shall contain basic wiring diagrams, schematics, and functional details. It is required that everything in the system be neatly labeled and easily identifiable. Include the following drawings as a minimum:

1. Block Diagram: Provide an overall block diagram showing the interconnection of major system components.

2. Arrangement Drawings: Provide drawings showing the physical arrangement of major system components. Components shown in the block diagrams shall be clearly identified in such a manner as to be easily correlated with the actual field components.

3. Wiring Diagrams: Provide wiring diagrams showing field installed interconnecting wiring. Wiring identification on the diagrams shall agree with the wire markers installed on the equipment.

3.4 MAINTENANCE

A. Provide a separate maintenance contract for specified maintenance service.

B. Provide service and maintenance of system for 1 year from Final Acceptance.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Clearing and grubbing

B. Excavating, scarifying, grading, filling, and compacting earth to grades and elevations shown on Drawings

C. Testing, characterizing, furnishing, placing, and compacting import fill and surcharge material

D. Removing excess earth from Project Site

E. For Work shown on Drawing No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

## 1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 02 41 13 - Selective Site Demolition

C. Section 02 61 14 - Excavating, Stockpiling, and Disposing of Chemically Impacted Soil

D. Section 32 11 24 - Crushed Miscellaneous Base

E. Section 32 13 14 - Concrete for Exterior Improvements

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Subgrade Stabilization:

a. The quantity of qualified native replacement material for soil that is determined by Engineer to be geotechnically unsuitable as a subgrade for fill or base material shall be measured by the cubic yard of native replacement material compacted in place at Project Site.

b. Payment shall be made under the contingency bid item Subgrade Stabilization (Contingency Item) of Bid Proposal Line Items. Final payment for soil quantities shall be verified by Engineer before and after field survey topographies. Allow 2 days in Construction Schedule for surveyors to perform before and after field topography before starting new Work.

c. Costs for excavating, handling, stockpiling, loading, and transporting the unsuitable material and costs for filling and compacting the resultant void with native soil, in conformance with this Section, and BASIC SITE MATERIALS AND METHODS Section shall be included in the bid item's unit price per cubic yard for native replacement material compacted in place.

2. Import and Place Fill Soil:

a. The quantity of tested and qualified import fill soil shall be measured by the cubic yard compacted in place at Project Site and shall be paid under Import Fill Soil bid item of Bid Proposal Line Items.

b. Payment for clearing and grubbing, excavating, handling, loading and disposing, transporting, placing, grading, and compacting in place Department-furnished import fill soil from Department's LAXT source site as shown in Appendix "K" of Specifications shall be measured by the cubic yard compacted in place at Project Site and shall be paid under Department-Furnished Import Fill Soil from LAXT bid item of Bid Proposal Line Items.

c. Payment for clearing and grubbing, excavating, handling, loading and disposing, transporting, placing, grading, and compacting in place Department-furnished import fill soil from within Project Site shall be measured by the cubic yard compacted in place at Project Site and shall be paid under Department-Furnished Import Fill Soil bid item of Bid Proposal Line Items.

3. Surcharge Material:

a. The quantity of tested and qualified surcharge material shall be measured by cubic yard in place at Project Site and shall be paid under the Surcharge Material bid item of Bid Proposal Line Items.

b. Payment to test, characterize, furnish, place, grade, compact, handle, load, transport, and dispose of Contractor-furnished surcharge material shall be paid under the Surcharge Material bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ASTM D2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

C. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

D. EPA SW-846 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.

E. City of Los Angeles Department of Public Works Brown Book:

Subsection 300-3 - Structure Excavation and Backfill

F. Reference Specifications (RS):

Section 300 - Earthwork

Subsection 300-2 - Unclassified Excavation

Subsection 300-3 - Structure Excavation and Backfill

Subsection 300-4 - Unclassified Fill

Subsection 300-5 - Borrow Excavation

Section 301 - Subgrade Preparation, Treated Materials, and Placement of Base Materials

Subsection 301-1 - Subgrade Preparation

Section 306 - Open Trench Conduit Construction

Subsection 306-1 - General

## 1.5 SUBMITTALS

A. Submit to Engineer for review and approval written documentation to identify the proposed fill and material source, previous uses of the land from which the fill and material originated, proposed import fill and surcharge material volume from each source, and sampling plan with a map showing depth and location of soil sample collection. After approval of fill and material source and sampling plan with a map, submit results of soil characterization performed. Contractor personnel who sample stockpiles should be competent in their understanding of environmental sampling, including sample collection and handling, sample preservation and storage, decontamination, and chain of custody procedures.

1. For In-situ Characterization: Provide a proposed plan for characterization including a map of borrowed site boundaries, depths of proposed excavations, depth horizons that shall be used for fill and material, and proposed analyses.

B. After approval of fill and material source, submit the following to Engineer for review and approval 30 Calendar Days prior to the receipt of soil to Project Site from Department property (re-use or borrowed soil from another area within Department property) or off Department property (import fill and surcharge material):

1. Completed Los Angeles Harbor Department Import Material Checklist form included in Appendix "G" of Specifications. Data from the characterization efforts shall be submitted with the completed form.

2. Sieve analysis conforming to ASTM C136/C136M.

3. Proposed trucking delivery schedule and haul route.

4. Analytical documentation submittals shall include “FINAL” analytical characterization information (Draft analytical data is not acceptable). Analytical documentation shall include the chain-of-custody noting the condition of soil samples upon arrival to the laboratory.

C. Submit the following during placement of import soil fill and surcharge material:

1. Documentation of daily volumes of fill material received and placement location within Project Site.

1.6 QUALITY ASSURANCE

A. Engineer reserves the right to approve materials to be used in construction. Approved materials that are no longer in conformance with this Section shall not be used.

B. Refer to BASIC SITE MATERIALS AND METHODS Section for sampling procedures for material to be compacted.

C. Analytical Laboratory Qualification: State of California Environmental Laboratory Accreditation Program (ELAP) accredited.

D. Soils Testing Agency Approval: Listed in the Los Angeles Buidling and Safety Approved Testing Agency Roster.

1.7 PERMITS

A. Comply with applicable South Coast Air Quality Management District (SCAQMD) permits and rules, and City of Los Angeles Department of Building and Safety permits. Obtain permits as required. Refer to REGULATORY REQUIREMENTS Section for additional requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Native Fill: Excavated materials may be re-used for fill as approved by Engineer, including backfill of voids left after removals in conformance with RS Subsection 300-4 exclusive of RS Subsection 300-4.9 and RS Subsection 300-4.10. Material shall not contain vegetation or other organics, rocks, broken concrete, debris, or other solid materials larger than 4 inches, or any other deleterious materials.

B. Import and Re-use Fill and Surcharge Material Geotechnical Requirements (from sites off and within Department property):

1. Fill and surcharge material, where required on Drawings or in Specifications, shall conform to RS Subsection 300-5, except for RS Subsection 300-5.4, and the following:

a. Fill and surcharge material shall consist of soil classified as SW, SM, SC, or SP in conformance with ASTM D2487. Soil shall have a minimum sand equivalent value of 20 percent in conformance with ASTM D2419.

b. Obtain Engineer's approval of material prior to transporting to Project Site.

C. Import Fill and Surcharge Material Environmental Requirements (from sites off and within Department property): Import fill and surcharge material shall conform to properties described in this Section. Refer to Appendix "G" of Specifications for Los Angeles Harbor Department Import Material Checklist.

1. Fill and surcharge source areas shall not be located in:

a. Industrial areas including airports.

b. Sites undergoing environmental cleanup.

c. Sites under regulatory oversight (Los Angeles Regional Water Quality Control Board (LARWQCB), Department of Toxic Substances Control (DTSC), and United States Environmental Protection Agency (US EPA))

d. Other sites where hazardous materials were used or hazardous wastes were generated (gasoline stations, dry cleaners, oil refineries, painting facilities, metal processing shops, and other similar sites).

2. Proposed import fill and surcharge material shall be tested by Contractor. Import fill and surcharge material shall be sampled at the place of origin and tested by an ELAP accredited analytical laboratory and certified in conformance with this Section. Additional materials shall not be added to stockpile after samples have been collected. Department retains the right to refuse any potential fill or surcharge material for use at any of its construction sites.

3. Submit the following to Engineer within 30 Calendar Days of Notice to Proceed (NTP): Provide written documentation that identifies the proposed fill and surcharge source, previous uses of the land from which the fill and surcharge originated, proposed import fill and surcharge material volume from each source, and sampling plan with a map showing depth and location of soil sample collection. After approval of fill and surcharge source and sampling plan with a map, submit results of soil characterization performed. Data shall be submitted to Engineer for review and approval 30 Calendar Days prior to the receipt of soil to Project Site. Upon approval by Engineer, Contractor shall deliver approved import fill and surcharge material to Project Site.

D. For import fill obtained from Department's LAXT source site (LAXT), coordinate with Engineer for access and refer to Appendix "K" of Specifications for address.

PART 3 – EXECUTION

3.1 SUBGRADE PREPARATION

A. Subgrade preparation shall be in conformance with RS Subsection 301-1 with the exception of compaction and payment requirements.

3.2 EXCAVATION

A. Excavation, including disposal of surplus material, shall be in conformance with RS Subsections 300-2 and 300-3 exclusive of RS Subsections 300-2.9 and 300-3.6. RS Subsection 300-3 shall be as modified by Brown Book Subsection 300-3.5.1.

B. Excavated slopes shall be uniform from top of bank to the toe of slope. Steps in height shall not exceed 2 feet. Step width shall be proportioned to achieve the overall slope at the theoretical slope location.

C. Tolerances shall be shown on Drawings.

D. Repair damage to existing slopes and adjacent structures where the slope material or other material outside of the limits of excavation is removed or disturbed.

E. Remove and dispose of logs, snags, cables, or any other debris encountered within the limits of excavation Work off of Department property.

F. During revetment reconstruction and excavation, existing material which slides into the channel due to excavation operations shall be removed or placed on the bank in conformance with Engineer's instructions at no additional cost to Department.

1. To prevent deleterious material from entering the waters of the harbor, provide heavyweight silt curtains required for containment of fine-grain soil plumes during excavation and removal of rock.

## 3.3 FILL PLACEMENT, GENERAL

A. Fill placement shall be in conformance with RS Subsections 300-4 and 300-5 except for 300-5.4.

## 3.4 IMPORT FILL AND SURCHARGE MATERIAL

A. Characterization and Testing Requirements:

1. Furnish labor, materials, laboratory analyses and reports, and equipment to characterize proposed import fill soil and surcharge material as defined in this Section. Data from the characterization efforts shall be submitted with the completed Los Angeles Harbor Department Import Material Checklist form included in Appendix "G" of Specifications.

2. Notify Engineer at least 72 hours prior to start of proposed import fill soil and surcharge material characterization Work.

3. Characterize proposed import fill soil and surcharge material using procedures contained in EPA SW-846 and the following sampling requirements:

| Fill Source | Target Compounds and Analyses |
|---|---|
| Land adjacent to or within 250 feet from existing freeway or major highway | - TPH (modified EPA Method 8015) |
| | - Lead (EPA Method 6010B) |
| | - PAHs (EPA Method 8310) |
| Mining area or rock quarry | - Heavy Metals (EPA Methods 6020 and 7471A) |
| | - Asbestos (polarized light microscopy) |
| Agricultural | - Pesticides and Herbicides (Organochlorine Pesticides: EPA Method 8081A or 8080A; Organophosphorus Pesticides: EPA Method 8141A; Chlorinated Herbicides: EPA Method 8151A) |
| | - Heavy metals (EPA Methods 6020 and 7471A), including hexavalent chromium (EPA Method 7199) |
| Acceptable commercial land | - VOCs (EPA Method 8021 or 8260B, as appropriate and combined with collection by EPA Method 5035) |
| | - Semi-VOCs (EPA Method 8270SIM) |
| | - TPH (modified EPA Method 8015B) |
| | - PCBs (EPA Method 8082 or 8080A) |
| | -Heavy metals including lead (EPA Methods 6020 and 7471A), including hexavalent chromium (EPA Method 7199) |

a. Pre-approved quarries, surcharge material, and import soil sources may be proposed to Department with supporting documentation including characterization and testing in conformance with this Section.

b. The analytical results shall be reviewed and accepted by Engineer prior to proceeding with importing of soil and surcharge material.

4. The required minimum sample frequency for each unique source of fill materials shall be as follows:

| Volume of Borrow Area Stockpile | Required Number of Samples per Volume |
|---|---|
| Up to 1,000 CY | 1 sample per 250 CY |
| 1,000 to 5,000 CY | 4 samples for first 1,000 CY +1 sample per each additional 500 CY |
| Greater than 5,000 CY | 12 samples for first 5,000 CY +1 sample per each additional 1,000 CY |

5. The required minimum sample frequency for each unique in-situ source of fill materials shall be based on approved documentation in conformance with Paragraph A.1 of Submittals Article of this Section. In-situ characterization typically requires approximately 2 to 3 times the number of samples required for stockpile characterization. The table in Paragraph 3.4 A.4 of this Section shows the required number of samples for stockpile characterization.

6. Proposed import fill material and surcharge material is considered to have a non-homogenous distribution of chemicals.

7. Composite sampling is not acceptable. Do not mix soil from different locations or different depths at 1 location into 1 sample. Do not add soil to a characterized stockpile.

    a. A borrow area or stockpile is defined as 1 contiguous source that is homogeneous in color and soil type.

B. Geotechnical Testing Requirements:

1. The required minimum sample frequency for each unique source of fill shall be one sample every 2,000 cubic yards.

C. Import Soil and Surcharge Material Transportation Requirements:

1. Select transporter with current insurance coverage, and applicable licenses as required by Department of Transportation and State of California.

2. Cover transported materials appropriately to minimize loss of material during transport.

D. Monitoring Requirements:

1. Air monitoring shall comply with local, state, and federal regulations and guidelines.

2. Provide field screening and monitoring equipment to monitor for:

   a. Worker safety.

   b. Air monitoring permit requirements.

3. Monitoring activities shall include, but are not limited to:

   a. Engineer shall evaluate the soil using a photoionization detector (PID), capable of detecting volatile organic vapors to a minimum of one part per million (ppm), to assess potential soil contamination levels. Soil with any PID readings greater than background (measured at a distance of no more than 3 inches from the surface of the soil material) shall be deemed suspect and considered potential chemical impacted soil (PCIS). Manage PCIS at Contractor's sole cost and expense in conformance with the following:

      1) PCIS shall be immediately removed from Project Site. No further import soil or surcharge material shall be brought in from contaminated import fill or surcharge material source location.

      2) Submit new fill material source location subject to characterization and testing requirements described in this Section.

      3) Resume importing fill and surcharge material after Engineer approves Los Angeles Harbor Department Import Material Checklist from new import fill and surcharge material source locations and other submittals required prior to start of fill soil and surcharge material import Work.

   b. Engineer may at times monitor the import soil and surcharge material for discolorations, odors, debris, and other physical or chemical characteristics. Soil not in conformance with this Section (identified by Department) shall be considered PCIS and shall be managed in conformance with Paragraph 3.4 C.3.a of this Section.

3.5 COMPACTION

A. Perform compaction in conformance with BASIC SITE MATERIALS AND METHODS Section.

3.6 CHEMICAL ANALYSIS REQUIREMENTS FOR IMPORT FILL

A. Import fill material shall be considered unacceptable for use if laboratory analytical results indicate an exceedance of 1 or more of the following specified concentration limits:

| Chemicals of Concern (COC) Industrial Land Use | Soil/Fill Material Concentration (mg/kg)* | Source |
|---|---|---|
| Total Petroleum Hydrocarbons (TPH) (EPA Method 8015M/8015B) | | |
| TPH (Total Petroleum Hydrocarbons) | 1,000 | Cal-EPA SWRCB** |
| - Gasoline (if present) | 180 | Cal-EPA SWRCB/DTSC** |
| - Diesel (if present) | 180 | Cal-EPA SWRCB/DTSC** |
| Heavy Metals (EPA Method 6020/7471A) | | |
| Antimony | 31 | EPA Regional Screening Level (RSL) |
| Arsenic | 8.7 | Cal-EPA SWRCB/DTSC** |
| Barium | 1,000 | 10 X STLC*** |
| Beryllium | 7.5 | 10 X STLC*** |
| Cadmium | 1.4 | Cal-EPA SWRCB/DTSC** |
| Chromium VI (EPA Method 7199/3060A) | 0.3 | EPA Regional Screening Level (RSL) |
| Total Chromimum | 100 | 20 X TCLP/STLC*** |
| Cobalt | 350 | Cal-EPA SWRCB/DTSC** |
| Copper | 69 | Cal-EPA SWRCB/DTSC** |
| Lead | 50 | 10 X STLC*** |
| Mercury | 0.69 | Cal-EPA SWRCB/DTSC** |
| Molybdenum | 4.4 | Cal-EPA SWRCB/DTSC** |
| Nickel | 200 | 10 X STLC*** |
| Selenium | 0.23 | Cal-EPA SWRCB** |
| Silver | 3.75 | Cal-EPA SWRCB/DTSC** |
| Thallium | 0.95 | Cal-EPA SWRCB** |
| Vanadium | 240 | 10 X STLC*** |

| Chemicals of Concern (COC) Industrial Land Use | Soil/Fill Material Concentration (mg/kg)* | Source |
|---|---|---|
| Zinc | 680 | Cal-EPA SWRCB/DTSC** |
| BTEX (EPA Method 8260) | | |
| Benzene | 0.055 | Cal-EPA SWRCB/DTSC** |
| Toluene | 56 | Cal-EPA SWRCB** |
| Ethylbenzene | 3.9 | Cal-EPA SWRCB** |
| Xylene | 7.2 | Cal-EPA SWRCB** |
| Naphthalene | 0.17 | Cal-EPA SWRCB** |
| Asbestos (OSHA Method ID-191) | ND | Laboratory Reporting Limit**** |
| Polychlorinated Biphenyls (PCBs) (EPA 8082) | ND | Laboratory Reporting Limit****/US EPA |
| Chemicals of Concern***** | | |
| Volatile Organic Compounds (VOCs) (EPA Method 8260) | ND | Laboratory Reporting Limit**** |
| Polynuclear Aromatic Hydrocarbons (PAHs) (EPA Method 8310) | ND | Laboratory Reporting Limit**** |
| Semi Volatile Organic Compounds (SVOCs) (EPA Method 8270) | ND | Laboratory Reporting Limit**** |
| Organochlorine Pesticides (EPA Method 8081A) | ND | Laboratory Reporting Limit**** |
| Organophosphorus Pesticides (EPA Method 8141A) | ND | Laboratory Reporting Limit**** |
| Chlorinated Herbicides (EPA Method 8151A) | ND | Laboratory Reporting Limit**** |

NOTES:

* Acceptable Soil/Fill Material concentrations may vary between regulated sites. Consult Engineer prior to analysis of samples to ensure the correct Laboratory Reporting Limits are achieved.

** Cal-EPA State Water Resources Control Board & Department of Toxic Substances Control (DTSC) Action Goals for Industrial Land Use sites only. The listed concentrations/levels may not be applicable for former or active cleanup sites, public land use, or worker health & safety.

*** Soluble Threshold Limit Concentration (STLC) and Toxicity Characteristic Leaching Procedure (TCLP), California Code of Regulations (CCR), Title 22, Section 66261.24. Characteristic of Toxicity.

**** Laboratory Reporting Limit is based on reporting limits commonly used by Southern California laboratories (DAF = 1). Note that for some regulated sites (to be determined by Department) target Laboratory Reporting Limits may need to be provided to the laboratory prior to sampling.

***** Any other suspected constituents or contaminants not shown on this table should be discussed with Engineer

B. Chemical analyses having a dilution factor greater than 1 or rendering the reporting limits greater than the concentration limits shown may be rejected by Department due to possible indication of elevated concentrations of one or more constituents.

3.7 CHEMICAL ANALYSIS REQUIREMENTS FOR SURCHARGE MATERIAL

A. Surcharge material shall meet the residential scenario of the most recent version of the following regulatory screening levels:

1. Department of Toxic Substances Control, Human Health Risk Assessment (HHRA) Note Number 3, DTSC-modified Screening Levels (https://dtsc.ca.gov/wp-content/uploads/sites/31/2025/04/HHRA-Note-3-Revised-April-2025.pdf).

2. United States Environmental Protection Agency, Regional Screening Levels (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables).

3. San Francisco Bay Regional Water Quality Control Board, Environmental Screening Levels (for petroleum only, https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/ESL/).

4. Department of Toxic Substances Control, Arsenic Strategies (https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/01/Arsenic-Cleanup-Goals-Jan09-A.pdf)

## 3.8 GEOTECHNICALLY UNSUITABLE SOIL

A. Notify Engineer upon encountering what appears to be geotechnically unsuitable soil. Upon excavating to design subgrade elevations, obtain Engineer's decision on soil's suitability and authorization to excavate geotechnically unsuitable materials to limits determined by Engineer and in conformance with Excavation Article of this Section. Unsuitable soil shall become the property of Contractor. Dispose of unsuitable soil off Department property following proper waste characterization and profiling protocols.

1. Native Soil Backfill: Maintain stockpile of native excavation soil approved by Engineer for use as fill or backfill in conformance with RS Subsection 300-2.6 until subgrade excavation is complete and the extent of geotechnically unsuitable soil is known. Backfill geotechnically unsuitable soil removal excavations with approved fill material. Compact in conformance with BASIC SITE MATERIALS AND METHODS Section.

## 3.9 FIELD QUALITY CONTROL

A. Refer to BASIC SITE MATERIALS AND METHODS Section, Field Quality Control Article, for Engineer's determination of maximum dry density and optimum moisture content, and for field-testing of compacted soil.

B. Record deviations in Work in the line and grade. Inform Engineer promptly upon detection of deviations exceeding tolerances identified in applicable Sections of Specifications and Articles of this Section. Record deviations which are accepted by Engineer (not corrected) in conformance with PROJECT RECORD DOCUMENTS Section.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Filter fabric

1.2 RELATED SECTIONS

A. Section 32 11 24 - Crushed Miscellaneous Base

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires filter fabric.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Filter fabric for the rock dike shall be Mirafi 600X as manufactured by TenCate. Other areas shown on Drawings to receive filter fabric shall conform to Caltrans Standard Specifications Section 96-1.02B.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Protect the filter fabric against deterioration.

B. Install filter fabric in 2 layers in areas unless noted otherwise on Drawings. Overlap fabric 3 feet when joining pieces and extend 3 feet beyond ends of the new Work area. Overlap existing filter fabric by 3 feet. Replace or repair existing filter fabric that is damaged at Contractor's sole cost and expense.

C. Anchor filter fabric across the top every 3 feet by a shot in anchor. Anchors shall be used only to hold fabric in place until concrete is poured or material placed on filter fabric.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Multi-axial geogrid system

1.2 RELATED SECTIONS

A. Section 31 00 00 - Earthwork

B. Section 32 11 24 - Crushed Miscellaneous Base

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Measurement of geogrid shall be on a square yard basis computed on the total area of geogrid shown on Drawings, including the area of geogrid used in overlaps. Measurement of overlaps shall be made on the basis of minimum overlap specified.

2. Payment for Work of this Section shall be paid under the corresponding Lump Sum Construction bid items of Bid Proposal Line Items. Such payment shall be considered full compensation for labor, materials, equipment, and other items necessary and incidental to completion of Work.

1.4 REFERENCES

A. Reference Specifications (RS):

Section 213 - Engineering Geosynthetics

Table 213-5.2 (E) - Multi-Axial

1.5 PRE-INSTALLATION MEETINGS

A. Prior to the installation of the geogrid, Contractor shall arrange a meeting at Project Site with the geogrid material supplier and, where applicable, the geogrid installer. Notify Engineer at least 3 days in advance of the date and time of the meeting. A representative of the geogrid supplier shall be available on an “as needed” basis during construction.

1.6 SUBMITTALS

A. Submit geogrid product sample approximately 4 inches by 7 inches or larger.

B. Submit geogrid product data sheet and certification from the manufacturer that the geogrid product supplied meets the requirements of Materials Article of this Section.

C. Submit manufacturer's written installation instructions and general recommendations.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall check the geogrid upon delivery to verify that the proper material has been received, free of flaws or damage occurring during manufacturing, shipping, or handling.

B. Storage and Protection:

1. Prevent excessive mud, wet concrete, epoxy, or other deleterious materials from coming in contact with and affixing to the geogrid materials.

2. Store at temperatures above minus 20 degrees Fahrenheit (F) (minus 29 degrees Celsius (C)).

3. Rolled materials may be laid flat or stood on end.

4. Geogrid materials shall not be left directly exposed to sunlight for a period longer than the period recommended by the manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Multi-axial geogrid shall conform to RS Section 213 and shall be integrally formed and produced from a single punched sheet of polypropylene.

B. Geogrid shall have the typical characteristics complying with RS Table 213-5.2 (E).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is properly prepared in conformance with EARTHWORK Section.

3.2 INSTALLATION

A. Place geogrid at the interface of the subgrade and base material as shown on Drawings.

B. Install geogrid in conformance with geogrid manufacturer's written instructions or as directed by Engineer.

C. Orient geogrid such that the roll length runs parallel to the longest side of Project Site.

D. Temporarily secure geogrid in place with ties, staples, pins, sand bags, or backfill as required by fill properties, fill placement procedures, weather conditions, or as directed by Engineer.

E. If 2 rolls of geogrid are to be placed side by side or end to end, overlap geogrid as noted in Table 1 of this Section or as directed by Engineer. Take care to ensure that the geogrid sections do not separate at the overlaps during construction.

Table 1
Recommended Overlaps

| Soil Type | California Bearing Ratio (CBR) | Grid Overlap |
|---|---|---|
| Firm Ground | >2 | 1 foot |
| Soft Ground | 1-2 | 2 feet |
| Very Soft Ground | <1 | 3 feet |

F. Placement of geogrid around corners shall require cutting of the geogrid product and diagonal overlapping of the geogrid to ensure that excessive buckling of the geogrid material does not occur.

3.3 BASE COURSE PLACEMENT OVER GEOGRID

A. Base course material shall be placed in lifts and compacted in conformance with CRUSHED MISCELLANEOUS BASE Section. Base course material shall be placed, spread, and compacted in such a manner that minimizes the development of wrinkles in the geogrid and movement of the geogrid.

B. Crushed miscellaneous base (CMB) shall be back dumped, end dumped, or belly dumped. Do not drive tracked equipment directly on the geogrid to prevent tracks from damaging the geogrid. At least 6 inches of CMB is required between the geogrid and tracks. Rubber-tired equipment may pass over the geogrid reinforcement at slow speeds (less than 5 miles per hour) and dump CMB as they go. Avoid sudden braking and sharp turning movements. Grade material to desired thickness.

C. If ruts are created in CMB due to construction traffic in the location of the geogrid, fill ruts with additional CMB material rather than blade out.

3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. The geogrid is subject to random inspections as directed by Engineer.

2. Any damaged or defective geogrid (such as frayed coating, separated junctions, separated layers, tears, and the like) shall be repaired or replaced as specified in Repair Article of this Section.

3.5 REPAIR

A. Any roll of geogrid damaged before, during, and after installation shall be replaced by Contractor at no additional cost to Department.

B. Proper replacement shall consist of replacing the affected area and adding 3 feet overlap of geogrid beyond the limits of the affected area.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Geotechnical instrumentation consisting of detailing, procuring and installing dike and landfill settlement monuments and settlement plates, in landfill soils and dike, and protection of said monuments from damage.

B. Post construction investigations consisting of performing Cone Penetrometer Testing (CPT), drilling approximately 5 inch diameter bore holes into the landfill and foundation soils and retrieving samples of these soils.

C. Purpose of the geotechnical instrumentation is to document as-built locations and elevations of dikes, monitor short and long term landfill soil and dike movements, monitor short and long term foundation and landfill settlement and provide means for long term monitoring of pore pressures in landfill and foundation soils.

D. Purpose of the post construction investigations is to provide information necessary to assess the properties of the landfill and foundation soils after landfill and dike construction are completed.

E. Soil samples obtained during the geotechnical investigations shall be subjected to laboratory testing at a laboratory selected by Engineer and at the sole cost and expense of Contractor. Engineer shall determine the types and number of tests to be performed.

## 1.2 RELATED SECTIONS

A. Section 31 00 00 - Earthwork

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Lump Sum Construction (Drawing No. 1-3302A) bid item of Bid Proposal Line Items.

2. Payment shall constitute full compensation for mobilization, labor, materials, and equipment necessary and incidental to the completion of this Work.

3. There shall be no additional compensation for down time resulting from break down of Contractor’s equipment or inclement weather.

4. Cost for this Work shall include costs associated with disposal of drill cuttings off Project Site.

1.4 REFERENCES

A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

B. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel.

C. ASTM B36/B36M - Standard Specification for Brass Plate, Sheet, Strip, and Rolled Bar.

D. ASTM D1586/D1586M - Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils.

E. ASTM D3441 - Standard Test Method for Mechanical Cone Penetration Testing of Soils.

F. ASTM D3550/D3550M - Standard Practice for Thick Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils.

G. ASTM D5778 - Standard Test Method for Electronic Friction Cone and Piezocone Penetration Testing of Soils.

H. Reference Specifications (RS):

Section 201- Concrete, Mortar, and Related Materials

Subsection 201-1.1.2 - Concrete Specified by Class and Alternate Class

1.5 DEFINITIONS

A. Bore Hole: An approximately 5 inch diameter bore hole consists of drilling a hole, using mud rotary drilling method, into the landfill and foundation soils to collect Standard Penetration Test (SPT) Data and obtain samples of the landfill and foundation soils for laboratory testing.

B. Cone Penetrometer Test: Cone Penetrometer Test (CPT) consists of pushing an electronic cone into the landfill and foundation soils at a specified location to collect engineering data on the properties of the soils. CPT's are terminated at a specified depth or when the cone can no longer be pushed into the ground (refusal).

C. Dike Settlement Monuments: A dike settlement monument consists of a steel pipe set in a concrete foundation on top of the completed dike.

D. Landfill Settlement Monuments: A surface settlement monument consists of a steel pipe welded to a base plate and placed below the top of surcharge grade. Steel pipe is brought above the top of surcharge grade.

E. Landfill Settlement Plates: A settlement plate consists of a steel pipe welded to a base plate and placed at the top of the landfill grade. Steel pipe is brought above the top of landfill grade.

F. Piezometer: A device which measures pore water pressure in soil and groundwater elevation at a specific point.

G. Surcharge: A surcharge consists of loosely-placed fill material above the top of the landfill grade to a specified elevation.

1.6 COORDINATION

A. General: Engineer shall provide technical direction and inspection for installation of geotechnical instrumentation and shall oversee performance of the post construction investigations.

B. Division of Responsibilities:

1. Contractor's Responsibilities:

a. Detail, procure and install geotechnical instrumentation including dike and landfill settlement monuments, settlement plates, piezometers and incidentals.

b. Provide equipment, operators and incidentals and perform post construction investigations immediately following completion of surcharge placement including bore holes, CPT's, borings, and sampling of landfill and foundation soils.

c. Prepare quarry rock dike, landfill, and surcharge for installation of settlement monuments and plates.

d. Protect settlement monuments and plates from damage until contract closeout.

e. Retain and transport samples obtained during investigations to laboratory for testing.

f. Arrange to perform laboratory soils testing services.

g. Periodically take readings from piezometers.

2. Engineer's Responsibilities:

a. Survey layout and as-built locations of settlement monuments, settlement plates, CPT's and bore holes.

b. Prepare a final survey plan showing the as-built locations, elevations and other pertinent information for monuments, instruments and investigations.

c. Periodically survey dike and landfill settlement monuments and settlement plates.

d. Oversee CPT operations performed by Contractor.

e. Observe drilling of bore holes and sampling.

f. Log borings performed by Contractor.

g. Determine types and number of laboratory tests.

h. Coordinate with Contractor.

i. Perform geotechnical investigations approximately 1 to 5 months following completion of surcharge placement.

C. Cooperation Between Contractor and Engineer: Contractor shall cooperate with Engineer during phases of the geotechnical instrumentation and post construction investigation program. Contractor shall provide necessary vehicular access to settlement monuments and plates, CPT and bore hole locations at all times.

1.7 SEQUENCING

A. The general sequence of Work shall be in the following chronological order:

1. Dike settlement monument installation

2. Landfill settlement monument installation

3. Cone penetrometer testing

4. Piezometer installation

5. Bore holes and sampling

1.8 SUBMITTALS

A. Schedule: Contractor shall submit a schedule that indicates the date to begin the geotechnical instrumentation and post construction investigation program. This shall include a procurement schedule for instruments which indicates fabrication, shipping and delivery dates.

B. Field CPT Data: Contractor shall prepare and submit CPT field data in hard copy and electronic file format in Microsoft Excel format for interpretation on a PC. Copies of raw data shall be made available to Engineer in the field as they become available.

C. Corrected CPT Data: Contractor shall submit corrected CPT data, and interpretations in hard copy and electronic file format in Microsoft Excel format for interpretation on a PC.

1.9 QUALITY ASSURANCE

A. Contractor shall engage the services of an instrument specialist to oversee the installation of instruments and ensure proper installation techniques.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Products and materials shall be stored in accordance with manufacturers or suppliers written recommendations. Any materials damaged as a result of improper storage at Project Site shall not be used in Work.

1.11 PROJECT SITE CONDITIONS

A. There shall be no vehicular access to the landfill after completion of the dredging and land filling.

B. Geotechnical investigations and installation of instruments shall be performed from the surface of the completed landfill or surface of the surcharge. Instruments shall be installed above groundwater.

C. Contractor shall provide a fresh water source for preparation of drilling muds and grouts. Salt water shall not be permitted for use in preparing grout or drilling mud.

PART 2 - PRODUCTS

2.1 SAMPLE CONTAINERS

A. Standard Penetration Test (SPT) Samples: SPT sample containers shall be new, 16-ounce, wide mouth glass jars with metal tops subject to approval by Engineer. Quantity: 30.

B. Ring Samples: Ring samples shall be new brass sample rings, 2.4 inch diameter. An adequate number of 1 inch and 6 inch high sample rings shall be provided. Ring samples shall be put in new 6 inch high PVC or plastic type liners with new plastic end caps subject to approval by Engineer. Quantity: 20.

C. Thin-Walled Tube Samples: Thin-walled tubes shall have 3 inch outside diameter with 1/16-inch thick wall subject to approval by Engineer. Quantity: 10.

2.2 SETTLEMENT MONUMENTS

A. Dike Settlement Monuments: These monuments shall consist of a nominal 2-inch-diameter galvanized steel pipe set in a concrete foundation on the final dike lift. The top of the pipe shall be not less than 3 feet or more than 5 feet above the final armor rock lift. The monuments shall be placed at a spacing along the dike, at locations where they shall not be destroyed by filling.

1. The dimensions of the foundation for the survey monuments shall be 2 feet square or 2 feet in diameter and be a minimum of 4 feet deep with 1 foot of the foundation above grade. The pipe shall be embedded 3 feet into the concrete foundation. Pipe shall have a minimum of 4 anchor studs in the concrete foundation, 2 each on opposite sides of the pipe. Anchor studs shall be 4 inches long.

B. Landfill Settlement Monuments and Plates: These monuments and plates shall consist of a nominal 2-inch-diameter galvanized steel pipe welded to a 2-foot-square galvanized steel plate. The top of the monument shall be threaded so that extra lengths of pipe can be added as the fill height increases. Additional pipe lengths and couplings shall be galvanized steel.

1. The pipe shall be encased in a larger diameter pipe having an inside diameter at least 2 inches greater than the outside diameter of the monument pipe coupling.

2. There shall be no contact between the inner monument pipe or couplings and the outer encasement pipe or surrounding soil.

3. Monument pipe couplings shall be coated with grease prior to placing the outer encasement pipe over the monument pipe.

C. Galvanized Pipe and Fittings: Pipe and couplings for survey monuments shall be schedule 40 galvanized pipe in conformance with ASTM A53/A53M. The top of each monument shall be fitted with a threaded galvanized end cap permanently fixed to the last pipe section on the monument. Pipe, couplings, end caps and studs shall be hot dip zinc galvanized.

D. Galvanized Steel Plate: Steel plate shall be 3/8 inch thick and meet the requirements of ASTM A242/A242M and shall be hot dip zinc galvanized.

2.3 CONCRETE

A. Concrete for dike settlement monuments shall be Class 560-C-3250 concrete for "Street Light and Traffic Signal Foundations, Survey Monuments" as specified in conformance with RS Subsection 201-1.1.2 , Table 201-1.1.2.

2.4 PIEZOMETERS

A. Contractor shall furnish piezometers of the pneumatic type that meet the following specifications:

1. Range: 0 to 1,400 kPa (0 to 200 psi)

2. Accuracy: 0.1 percent of Full-Scale

3. Displacement: 0.002 cc (0.00012 cu.in.)

4. Material: Glass reinforced, nylon 12 with ethylene propylene diaphragm.

B. Individual piezometers shall be attached to appropriate plastic bases. Each base and piezometer shall be encapsulated and sealed within an envelope of geotextile fabric having a maximum apparent opening size (AOS) of 70 microns. The outside filter area of each assembled unit shall be a minimum of 50 square inches.

C. Contractor shall furnish digital readout instrument compatible with the piezometer and shall meet the following requirements:

1. Range: 0 to 1,400 kPa (0 to 200 psi)

2. Total System Accuracy (piezometers and readout): 0.1 percent of Full-Scale

3. Resolution: 0.05 percent of Full-Scale

D. The length of the connecting tubes for each piezometer shall be determined before ordering. Piezometers shall be supplied from the manufacturer with a single continuous connecting tube length, calibrated and ready to install. Tubing splices shall not be permitted without approval of Engineer. When tubing is laid over original ground or a working table, it shall be snaked to allow for ground and fill movements during settlement. Piezometers shall be labeled, properly logged, and protected during construction. Piezometers shall be handled and monitored in accordance with the manufacturer's specifications. Manufacturer name, type, operating pressure range, sensitivity, and other pertinent information shall be furnished to Engineer before installation at Project Site.

2.5 INSTRUMENT IDENTIFICATION PLATES

A. Dike Monuments: Each dike monument shall have a 6 inch wide, 4 inch long, 1/8 inch thick brass plate conforming to ASTM B36/B36M permanently fixed to the top of the concrete foundation using a suitable grout or concrete anchor studs.

B. Landfill Monuments and Plates: Each landfill monument and plate shall have a brass strip conforming to ASTM B36/B36M 4 inches wide, 3 inches long and 1/16 inch thick permanently fixed to the top of the pipe with brass screws. The plate shall be bent and fitted around the pipe and be located 2 inches below the end cap.

C. Brass plates for settlement monuments and settlement plates shall be permanently engraved with the following as-built information:

1. The monument designation number as shown on Drawings;

2. Date monument was set;

3. Monument end cap elevation to the nearest 10th of a foot at the time of setting;

4. Base plate elevation to the nearest 10th of a foot at the time of setting (landfill monuments and plates only);

5. Northing and Easting coordinates, in Zone 5 feet, of the end cap to the nearest 10th of a foot and the survey control line station (dike monuments only) at the time of setting.

PART 3 - EXECUTION

3.1 SETTLEMENT MONUMENT AND PLATE INSTALLATION

A. Contractor shall install the settlement monuments and plates. Contractor shall demonstrate to Engineer that the monuments and plates are securely fixed into place and the pipe survey monuments and plates are installed true to vertical.

B. Dike Settlement Monuments: Contractor shall coordinate Work so that the settlement monuments on the dike are installed within 2 weeks after the final dike has been placed to grade at each location. The rock dike shall be brought to the required grade for a distance of 50 feet on each side of where each settlement monument is to be placed. Notify Engineer at least 1 week prior to the date on which the dike shall be completed and the monument installed.

1. Locations of dike monuments shall be as shown on Drawings.

C. Landfill Settlement Plates: Contractor shall commence installation of the settlement plates on the land fill when the fill has reached elevation plus 7 feet and is stable enough to permit placement of the plate.

1. Contractor shall extend settlement plates in surcharge areas to new grade as the grade around each instrument is raised. Contractor shall perform the extension.

2. Locations of landfill plates shall be as shown on Drawings.

D. Landfill Settlement Monuments: Contractor shall commence installation of the settlement monuments on the land fill when the fill has reached elevation plus 7 feet and is stable enough to permit placement of the monument.

1. Locations of landfill monuments shall be as shown on Drawings.

E. Piezometers:

1. Contractor shall commence installation of piezometers concurrently with wick drain installation using the same equipment used to install wick drains. Piezometers shall be pushed at locations shown on Drawings and pushed to elevations shown on Drawings. Piezometer units shall be protected within a steel enclosure to prevent damage during installation.

2. After completion of the installation of the piezometer devices, Contractor shall maintain the devices and repair any damage to the devices caused by Contractor's operations at Contractor's sole cost and expense.

F. Monuments and plates shall be installed true to the vertical. A tolerance of 1/2 percent inclination, calculated over the length of the monument from bottom of footing to end cap shall be permitted. Measurement of true vertical shall be checked by Engineer using a level after the pipe is set and the concrete foundation is hardened. Any monument installed with an out of tolerance inclination shall be rejected by Engineer and removed and replaced by Contractor at Contractor’s sole cost and expense.

3.2 POST CONSTRUCTION GEOTECHNICAL INVESTIGATIONS

A. Sequence of Investigations: The post construction investigations shall not begin in any area prior to the completion of landfilling and surcharging to the elevations shown on Drawings. Two separate investigations, each consisting of 1 bore hole, shall be performed. In any particular area, the first investigations shall commence no later than 1 month after the completion of the surcharge to the elevations shown on Drawings. The second investigation shall commence no later than 4 ½ months after the completion of the surcharge, but no sooner than 4 months after the completion of the surcharge. Engineer may change the schedule for the investigations at no additional cost to Department. Contractor shall notify Engineer at least 1 week prior to the investigations. This may require more than one mobilization to ensure commencement of investigations no later than 1 month after the completion of landfilling in a particular area. CPT's shall be completed and results reported to Engineer prior to performing geotechnical bore holes. Engineer shall be given up to one week to review CPT data in a particular area after which time Contractor may begin the geotechnical bore holes.

B. Equipment: Equipment which Contractor proposes to use in Work shall be modern equipment in good operational condition.

1. Plant, equipment, hydraulic push systems, hammers and drop systems, geotechnical samplers, electronic cones and methods to be used by Contractor shall be subject to the review and approval of Engineer.

C. Cone Penetration Testing: The diameter of CPT cone shall be 1.42 inches (35.6 mm) unless otherwise approved by Engineer. CPT soundings shall be advanced down to the depth shown on Drawings unless otherwise directed by Engineer. If refusal is encountered prior to reaching the specified depth, the location shall be moved 5 to 10 feet and CPT sounding shall be repeated until the depth shown on Drawings is reached. CPT soundings shall be performed using an electric friction cone probe in conformance with ASTM D3441 and ASTM D5778. The cone shall be equipped with a pore pressure transducer.

1. The field readout for CPT soundings shall indicate continuously during penetration, the depth, cone tip resistance and side friction, friction ratio pore pressure, pore pressure ratio, and inclination.

2. CPT holes shall be grouted as directed by Engineer using a bentonite cement grout.

3. Complete records shall be kept by Contractor for CPT testing for submission to Engineer. CPT data shall be made available to Engineer in the field for study. Complete CPT records in report format together with notes, remarks, pertinent information and data on CD in Microsoft Excel format shall be submitted by Contractor to Engineer within 2 weeks after completion of CPT Work for a particular area.

4. Location and depth of CPT's shall be as shown on Drawings.

D. Bore Holes: The inside diameter of the bore hole shall not be less than 5 inches. The borings shall be advanced down to the depth shown on Drawings unless otherwise directed by Engineer. Every attempt shall be made by Contractor to advance the hole true to vertical. The hole shall be cased for the full depth of drilling within the hydraulic landfill unless Contractor can demonstrate that the hole shall remain stable with the use of drilling mud. Thereafter, the hole shall be kept open and stable using a bentonite slurry drilling mud for the remainder of the exploration.

1. The hole shall be kept full of slurry drilling mud at all times. The hole shall be covered at the end of the working day. Drilling mud shall be Variflo Natural Organic Drilling Fluid as supplied by Colloid Environmental Technologies Company (CETCO).

2. The bore holes shall be grouted as directed by Engineer using a bentonite cement grout.

3. Location and depth of borings shall be as shown on Drawings.

E. Standard Penetration Test (SPT): Drive samples shall be taken at 3 foot intervals within the landfill until original ground is encountered and thereafter at 5 foot intervals in each bore hole. The hole shall be drilled out to the sample elevation prior to sampling.

1. Contractor shall use a 2-inch outside diameter (OD), 1 3/8 inch inside diameter (ID) standard split spoon sampler to obtain samples. A thin plastic or metal sample retainer shall be used for each sample.

2. The sampler shall always be driven with the same weight of hammer having the same drop in conformance with ASTM D1586/D1586M. The hammer shall be a donut type or safety type hammer or an above ground automatic trip hammer. Manual drop hammers shall be operated with a rope and cathead in conformance with ASTM D1586/D1586M. Contractor shall submit a certification from a certified testing laboratory or the manufacturer of the hammer that the drop weight of the hammer is 140 pounds plus or minus 2 pounds. Downhole hammers shall not be permitted. The sampler shall be driven for a full 24 inches penetration and blows shall be counted for each 6 inches interval. The sampler shall be seated before blows are counted. Contractor shall take care to ensure that the drop height of the hammer is maintained at 30 inches.

3. If a sample is not obtained the first time, the operation shall be repeated. If second driving of the spoon fails to secure a sample, a spoon with a flapper shall be used. Should this second procedure fail to secure a sample, an auger or sand trap shall be used until the required sample is obtained.

4. Representative specimens of each SPT shall be preserved immediately after being recovered, in 16-ounce, wide-mouth, airtight, clear glass jars sealed with a non-shrinking wax, Socony Vacuum Oil Company Product 2300. The covers of the jars shall be marked with date, boring and sample number, depth or elevation, blow count, and Project title. A label shall then be affixed to the jars, clearly and legibly showing the information on the cap and a visual identification of the type of material.

F. Ring Samples: Ring samples shall be taken when directed by Engineer. Contractor shall use a 3-1/4 inches (OD) Modified California Sampler with standard 2-1/2 inches (ID) rings to obtain the samples. The sampler shall be prepared for each sample using 1 inch wide rings. The rings shall be either new brass or copper.

1. Each sampler shall always be driven with the same weight of hammer having the same drop in conformance with ASTM D3550/D3550M. The sampler shall be driven for a full 18 inches penetration and blows shall be counted for each 6 inches interval. The sampler shall be seated before blows are counted.

2. Each ring sample, shall be placed first in a plastic bag and then in a plastic tube having the same inside diameter as the outside diameter of the rings. The top of the plastic bag shall be twisted and folded down and then the plastic caps shall be placed on the ends of the tube. The caps shall be sealed with tape on each end of the tube. The ends shall then be sealed with a non-shrinking wax, Socony Vacuum Oil Product 2300 to ensure an airtight seal. The tube shall be marked with indelible ink to show the date, the boring and sample numbers, the depth or elevation, the blow count and the title of Project.

G. Thin-Walled Tube Samples: Undisturbed samples shall be obtained when directed by Engineer. The sampler shall be a standard thin wall tube.

1. The sampling stroke shall be 2 inches shorter than the maximum stroke to prevent possible compression of the top of the sample. A minimum time of 10 minutes shall then elapse before the sampler is rotated at least 2 full turns to shear the end of the sample. The assembly shall then be slowly withdrawn and a cap placed on the bottom of the tube immediately after removal from the bore hole.

2. The voids at the top and the bottom of the tube shall be filled, but not packed, with either moist sand, or moist sawdust as directed by Engineer. A metal and rubber packer device approved by Engineer shall then be inserted into each end of the tube to prevent sample disturbance due to movement. Both ends of the tube shall then be capped and sealed with friction tape and wax. Both ends of the sample shall be coated with a non-shrinking wax, Socony Vacuum Oil Product 2300, to ensure an airtight seal. The tube shall be marked with indelible ink to show the date, the boring and sample numbers, the depth or elevation, the recovery ratio, the maximum hydraulic pressure required to advance the sampler and Project title.

H. Drilling Obstructions: It shall be Contractor's responsibility when obstacles are encountered to carry the drilling through or past such obstacles or redrill the bore hole to the same elevation and continue sampling at no additional cost to Department.

## 3.3 DISPOSAL OF DRILL CUTTINGS

A. Drill cuttings resulting from geotechnical bore holes shall become the property of Contractor. Contractor shall dispose of drill cuttings off of Department property in conformance with local, state and federal authorities having jurisdiction over the disposal of drill cutting.

## 3.4 GEOTECHNICAL INSTRUMENTATION

A. Pneumatic Piezometers: Pneumatic piezometer arrays shall be installed after the applicable areas have been brought to the elevations shown on Drawings.

B. Piezometers shall be installed in conformance with the written recommendations of manufacturer or supplier and with approved installation procedure detailed in Contractor's submittal and approved by Engineer.

C. Piezometers shall be properly saturated in conformance with manufacturer's written directions prior to insertion into the ground.

D. Piezometers shall be installed in bore holes having a minimum diameter as recommended by manufacturer or supplier. Each piezometer shall be installed in a separate bore hole. The bore hole shall be advanced to an elevation 4 1/2 feet above the specified elevation of the piezometer. The piezometer shall then be pushed 4 1/2 feet into the bottom of the bore hole to its specified elevation. Piezometers shall be pushed into the ground using equipment and procedures as recommended by the manufacturer or supplier and approved by Engineer. For specified piezometers, a standard Mandrel (Slope Indicator Part No. 9141730) with an AW rod pin shall be used.

E. Bore holes shall be tremie grouted or backfilled with an approved bentonite seal for a minimum thickness of 6 meters above the bottom of the bore hole. The remainder of the bore hole shall be tremie grouted or backfilled with an approved bentonite cement grout.

F. The pneumatic tubing running from the bore hole to the terminal pipe shall be embedded in the ground a depth between 60 and 90 centimeters.

G. The terminal pipe shall be embedded in concrete. Tubing shall be run through PVC Pipe encased in the concrete. Pneumatic tubing shall not be directly in contact with the concrete encasement.

H. Location of piezometer arrays and elevation of pneumatic piezometers are shown on Drawings. Those elevations are estimates within plus and minus 3 feet. Engineer shall determine the exact elevations upon completion of CPT and geotechnical bore hole program. Contractor shall not order instruments until after Engineer has reviewed the results of CPTs.

I. Installation Records: After each Work day for installation of geotechnical instruments, Contractor shall submit to Engineer the installation records for the day.

J. The format for the records shall be submitted by Contractor and agreed upon by Engineer and Contractor's instrument specialist. The installation records shall serve as the quality assurance checklist and as a minimum shall include the following information:

1. Project name;

2. Instrument type and number;

3. Planned location in plan and elevation;

4. Planned lengths, widths, diameters, depths, and volumes of materials and backfill;
5. Personnel responsible for installation;
6. Plant and equipment used, including diameter and depth of drill casings, rods, and the like;
7. Date and time of start and completion of installation;
8. Weather including temperature at the times of installation and testing;
9. Results of the necessary measurements or readings required during installation including results of acceptance and function tests;
10. Subsurface data information;
11. Type of backfill used;
12. As-built location in plan and elevation;
13. As-built orientation;
14. As-built lengths, widths, diameters, depths, and volumes of materials and backfill; and
15. A space for notes including problems during installation, delays, unusual features of installation, and any events which may have a bearing on instrument behavior.

## 3.5 PROTECTION OF MONUMENTS, PLATES, AND PIEZOMETERS

A. Contractor shall be responsible to protect the settlement monuments and instrumentation from damage as a result of his operations on Project Site.

B. Contractor shall place or construct barricades, guard posts, or other protective devices, as necessary. Contractor shall repair or replace, at Contractor's sole cost and expense, damaged settlement monuments, and plates and piezometers. Engineer, after review, shall determine the extent and type of damage and shall determine whether repair or replacement is required.

C. Contractor shall provide damage protection as specified in this Section, at all times including for the extensions of landfill settlement plates until close out of Contract.

## 3.6 ACCEPTANCE OF GEOTECHNICAL INSTRUMENTATION

A. Function Checks: Function checks shall be performed to verify calibration and proper operation of the piezometers. Instrumentation shall be tested in the field after delivery using the manufacturer's test procedures. In addition, the following tests shall be performed:

1. Pneumatic Piezometers: Each piezometer shall be tested by placing the piezometer into a known depth of water and reading the pore pressure. The piezometer connector to the tubing shall be checked for tightness. The reading of pore pressure shall be within the accuracy of the instrument as stated by the manufacturer's data. This test shall be repeated 3 times at different times at different water depths for each piezometer.

2. Acceptance Tests: After installation, the pneumatic piezometers.

3. After complete installation of an array of pneumatic piezometers, each piezometer in the array shall be tested. Each transducer connector shall be connected to the pneumatic indicator and readings taken. Readings shall be taken once every hour for 3 hours. The repeatability of the readings shall be evaluated to ensure proper operation. The repeatability shall be examined by Engineer and Contractor's instrument specialist and an evaluation made of whether the data are within the expected tolerances. Piezometers which lack repeatability of the three readings shall be rejected.

4. Any instrument failing function and acceptance tests shall be rejected and returned to the manufacturer by Contractor and replaced with a properly operating instrument.

## 3.7 SURVEY AND MONITORING

A. Periodic Surveys:

1. Engineer shall survey the settlement monuments and settlement plates periodically. The dike and landfill settlement monuments shall be surveyed once every week for the first 8 weeks and bi-weekly thereafter. The settlement plates shall be surveyed daily during surcharge placement, weekly for the first 8 weeks after completion of surcharge, and once every 2 weeks thereafter. Survey data shall include Northing and Easting coordinates, in Zone 5 feet, in addition to elevations.

B. As-Built Survey:

1. Engineer shall provide an as-built survey showing pertinent information for the instrumentation and geotechnical investigations as previously specified including as-built coordinates of CPT's, bore holes and information appearing on settlement monument and settlement plate identification plates.

C. Accuracy:

1. As-built elevations and coordinates shall be determined to the nearest 10th of a foot.

D. Pore Pressure Readings:

1. Contractor shall monitor piezometers and gather pore pressure data immediately after installation. After installation, pore pressure readings shall be taken at every piezometer once every 2 days during surcharge placement, and after surcharge placement once every week for the first 8 weeks and once every 2 weeks thereafter. Contractor shall submit the data obtained from the reading within 48 hours of collection.

2. If the settlement monitoring programs indicated that the settlement of the footings are in excess of 1/8-inch, construction activity shall be discontinued immediately until corrective actions can be implemented to reduce the settlement.

## 3.8 OWNERSHIP OF DOCUMENTS AND SAMPLES

A. Samples obtained and documentation prepared become the property of Department. Original field logs, sketches and other data used in preparation of documents shall be delivered to Engineer at the completion of Work. Department retains ownership of samples, test results and documentation.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Methane mitigation systems building protection

B. Building sub-slab methane gas piping

C. Sub-slab membranes

D. Sub-slab venting systems, vent rises, and conduit seals

1.2 RELATED SECTIONS

A. Section 31 23 33 - Trenching and Backfilling

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work in this Section shall be paid under the Methane Zone Mitigation bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. API Spec 5L - Line Pipe.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

C. ASTM B106 - Standard Test Methods for Flexivity of Thermostat Metals.

D. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

E. ASTM C131/C131M - Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

F. ASTM D413 - Standard Test Methods for Rubber Property—Adhesion to Flexible Substrate.

G. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.

H. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.

I. ASTM D751 - Standard Test Methods for Coated Fabrics.

J. ASTM D792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.

K. ASTM D1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.

L. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).

M. ASTM D1693 - Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics.

N. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

O. ASTM D2464 - Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

P. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

Q. ASTM D3776/D3776M - Standard Test Methods for Mass Per Unit Area (Weight) of Fabric.

R. ASTM D3786/D3786M - Standard Test Method for Bursting Strength of Textile Fabrics--Diaphragm Bursting Strength Tester Method.

S. ASTM D3884 - Standard Guide for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method).

T. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc-Type Apparatus.

U. ASTM D4533/D4533M - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

V. ASTM D4751 - Standard Test Methods for Determining Apparent Opening Size of a Geotextile.

W. ASTM D5034 - Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test).

X. ASTM D5035 - Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method).

Y. ASTM D5193/D5193M - Standard Test Method for Coated Fabrics—Air Retention.

Z. ASTM D6134/D6134M - Standard Specification for Vulcanized Rubber Sheets Used in Waterproofing Systems.

AA. NFPA 70 - National Electrical Code.

1.5 SUBMITTALS

A. Shop Drawings:

1. Submit to Engineer shop drawings, layout diagrams, catalog data and literature, instructions, directions, guarantees, test reports, and information in sufficient detail, to show complete compliance with specified requirements.

2. Samples:

a. Imported Sand and Gravel: Submit to Engineer initial product samples for testing.

b. Samples of methane membrane proposed for Project.

3. Piping Materials: Submit to Engineer technical material that verifies PVC and black steel pipe meet material Specifications of this Section.

4. Methane Membrane and Pre-fabricated Membrane Boots: Submit to Engineer certificates of compliance from manufacturer and supplier of these materials certifying that methane membrane is free from defects and is of required thickness, strength, durability, and dimensional stability and that required factory tests have been performed and materials meet Specifications of this Section.

5. Manufacturer's written instructions for membrane field seaming and repair.

6. Manufacturer’s or installer’s mix design for spray applied membrane and samples of 60 mil thick application, if applicable.

7. Sealants: Submit to Engineer from manufacturer or supplier of each sealant material a written description of material contents and performance data for verification that each meets requirements of this Section.

8. Trench Dam Materials. If bentonite or cement slurry is used for trench dams, provide mix design data and product data for bentonite and cement to Engineer for verification of compliance with this Section. If soil is used for trench dam, a grain size analysis shall be performed on material to be placed for each dam.

1.6 QUALITY ASSURANCE

A. Department shall provide and pay for services of a gas mitigation engineer to ensure compliance with methane mitigation requirements for Project.

B. Comply with following as a minimum requirement: Standard Specifications for Public Works Construction (Reference Specifications) except as modified in this Section and State of California Department of Toxic Substances Control (DTSC) Advisory on Common Remedies for Methane in Subsurface Soils, City of Los Angeles Department of Building and Safety (LADBS) Methane Mitigation Standards.

C. Sampling, testing, and certification of imported or exported soils shall be performed as specified in this Section.

D. Certification of Leak or Smoke Testing of methane Membrane and Spray Applied Membrane (if applicable): Engineer shall observe leak testing and prepare written certification that it was performed in conformance with procedures described this Section and that area passed testing.

E. Photographs shall be taken of representative areas of sub-surface gas mitigation systems and locations of each photograph recorded on a log for documentation.

1. Methane mitigation manufacturer shall be regularly engaged in manufacturing, commissioning, and maintenance of methane gas detection systems, and shall have at least 10 years experience demonstrated technical expertise in manufacture, commissioning, and maintenance of systems or similar size and complexity.

1.7 PROJECT CONDITIONS

A. Information on Drawings or in soils report does not constitute a guarantee of accuracy or uniformity of soil conditions over Project Site.

B. A copy of foundation investigation and soils report is available for examination at Engineer’s office during regular office hours.

C. Work described in these Specifications is for mitigation of potential subsurface gas conditions involving methane, only. Copies of methane site investigation report and supporting documentation that describes these conditions are available for examination at Engineer’s office during regular office hours.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Subsurface gas mitigation systems shall be constructed as shown on Drawings and as specified in this Section to provide control and protection of building interior space to subsurface methane gas that is naturally occurring from deposits underlying terminal site.

B. Systems to be used vary depending on facility use and can be generally described as follows:

1. A network of slotted piping installed below each floor slab and embedded in a permeable gravel layer that shall continuously serve to collect air or gas mixture and convey it through solid pipes to vent risers located outside buildings (at locations away from receptors) for discharge to atmosphere.

2. A cold, fluid-applied methane membrane installed continuously beneath floor slab;

3. Trench dams installed in any utility trench that extends beneath building. These trench dams serve to prevent gas migration along trench backfill from accumulating beneath building; and

4. Seals installed in or around each penetration of floor slab.

5. Outdoor surfaces to be covered with low permeability material including portland cement or asphaltic concrete (i.e. hardscape areas adjacent to buildings) shall have a series of paving vents installed in pavement that serve to collect and vent accumulating gases.

2.2 MATERIALS - GENERAL

A. Materials shall be of new stock of highest grade available, free from defects and imperfections, of recent manufacture, and unused.

## 2.3 BLACK STEEL PIPES

A. Carbon steel pipes and fittings: Riser protective casings shall be carbon steel (CS) API Spec 5L Grade B, ASTM A53/A53M, or ASTM B106, Grade B.

## 2.4 POLYVINYL CHLORIDE (PVC) PIPES AND FITTINGS

A. PVC pipes and fittings shall be Schedule 80, conforming to requirements of ASTM D1785, ASTM D2464, and ASTM D2466, and shall have been approved by National Sanitation Foundation (NSF).

## 2.5 GRAVEL FOR SUB-SLAB SYSTEM

A. Gravel shall be clean, river run or unbroken round gravel of 3/4 inch maximum size. Material shall meet ASTM C33/C33M Paragraph 9.1 requirements with gradation conforming to following and a permeability of 1 cm/sec or better:

B. Specifications For Gravel:

| Sieve Size | Percentage Passing Sieve |
|---|---|
| | 3/4 inch gravel |
| 1-1/2 inch (37.5 millimeter (mm)) | 100 |
| 1 inch (25.0 mm) | 90 to 100 |
| 3/4 inch (19/0 mm) | 55 to 85 |
| 3/8 inch (9.5 mm) | 8 to 20 |
| No. 4 (4.75 mm) | 0 to 5 |
| No. 8 (2.36 mm) | 0 to 5 |
| No. 200 (75 mm) | 0 to 2 |
| ASTM C131/C131M Test Grading | B |

## 2.6 SAND FOR SUB-SLAB AREAS

A. Sand to be used for dispersion layer shall be free of deleterious amounts of organic material, mica, loam, clay, and other substances not suitable for intended purpose with a permeability of 1 by 10-1 centimeter per second (cm/sec), with gradation conforming to following:

B. Grain Size For Dispersion Layer Sand:

| Sieve Size | Percentage Passing Sieve |
|---|---|
| No. 6 (3.35 mm) | 100 |
| No. 8 (2.36 mm) | 98 to 100 |
| No. 12 (1.70 mm) | 55 to 89 |

| | |
|---|---|
| No. 16 (1.18 mm) | 10 to 46 |
| No. 20 (0.85 mm) | 1 to 13 |
| No. 200 (0.074 mm) | 0 to 5 |

2.7 GEOTEXTILE FABRIC

A. Geotextile fabric for protection of HDPE membrane shall be minimum 16 ounces per square yard (oz/sq yd), non-woven, needle-punched polypropylene fabric, Fibertex, of uniform thickness, and surface texture and conforming to properties given below.

B. Priorities of Geotextile Fabric:

| Property | Test Method | Value |
|---|---|---|
| Weight | ASTM D3776/D3776M | 16 oz/sq yd |
| Tensile Strength | ASTM D5034, ASTM D5035 | 380 pounds |
| Elongation at Break | ASTM D5034, ASTM D5035 | 50 percent |
| Puncture Strength | ASTM D751 | 235 pounds |
| Trapezoidal Tear | ASTM D4533/D4533M | 140 pounds |
| Mullen Burst Strength | ASTM D3786/D3786M | 750 pound per square inch (psi) |
| Apparent Opening Size | ASTM D4751 | 100 US Sieve |
| Permittivity | ASTM D3884 | 200 pounds |
| UV Resistance Percent Retained | | 70 percent at 500 hours |

2.8 COLD, FLUID-APPLIED METHANE MEMBRANE

A. Methane membrane shall be oil-resistant, 60-mil thickness conforming to properties as given in following table and as manufactured by Tremco, Inc. Methane gas transmission rate for membrane shall be less than 40 cc/sq m-24 hours atm. Membrane shall be compatible with environment in which it shall be used.

B. Properties of HDPE Membrane:

| 60 Mil HDPE Property | Test Method | Value |
|---|---|---|
| Gage (Nominal) | -- | 60 |
| Thickness, Mils Minimum Plus or Minus 10 percent | ASTM D5193/D5193M Paragraph 8.1.3 | 54 |

| | | |
|---|---|---|
| Specific Gravity Minimum | ASTM D792<br><br>Method A | 0.094 |
| Minimum Tensile Properties Each Direction | ASTM D638 | |
| 1. Tensile Strength Yield (pounds/in width) | | 120 |
| 2. Tensile Strength At Break (pounds/in width) | | 180 |
| 3. Elongation At Yield (Percent) | | 10 |
| 4. Elongation At Break (Percent) | | 500 |
| 5. Modulus Of Elasticity (pounds per square inch) | | 80,000 |
| Tear Resistance (pounds/minimum) | ASTM D1004 Die C | 30 |
| Low Temperature, Degree Fahrenheit (F) | ASTM D746<br>Procedure B | minus 40 |
| Dimensional Stability Each Direction (Percent Change Direction) | ASTM D1204 212 degrees, 15 Minimum | plus or minus 3 |
| Resistance To Soil Burial (Percent Change Maximum In Original Value) | ASTM D6134/D6134M | |
| 1. Tensile Strength Yield | | 10 |
| 2. Tensile Strength At Break | | 10 |
| 3. Elongation At Yield | | 10 |
| 4. Elongation At Break | | 10 |
| 5. Modulus Of Elasticity | | 10 |
| Environmental Stress Crack (Minimum, Hours) | ASTM D1693 | 500 |
| Factory And Field Seam Requirements | | |
| Bonded Seam Strength (Factory Seam Breaking Factor, Ppi Width) | ASTM D6134/D6134M | 108 |
| Peel Adhesion (pounds in minimum) | ASTM D413 | Film Tear Bond |
| Dead Load | | |
| Room Temperature 73 degrees F 50 percent Bonded Seam Load | Appendix A | Pass |
| Elevated Temperature 158 degree F 25 percent Bonded Seam Load | Appendix A | Pass |
| Resistance to Soil Burial Peel Adhesion | ASTM D6134/D6134M | Film Tear Bond |

| | |
|---|---|
| Bonded Seam Strength (Percent Change Maximum in Original Value) | minus 20 |

2.9 PREFABRICATED MEMBRANE BOOT

A. Prefabricated membrane boot shall be at least 60-mil HDPE membrane or equivalent membrane material, and shall be manufactured by same manufacturer as membrane.

2.10 CLAMPS

A. Pipe clamps shall be stainless clamps, Mission Clay Products No. 37.

2.11 BUTYL RUBBER TAPE

A. Butyl rubber tape shall be GS No. 4 as manufactured by General Sealants.

2.12 SEALANT

A. Oil-resistant polyurethane sealant shall be FP 1212 Pourable Joint Sealant, as distributed by General Sealant.

2.13 PIPE JOINTING

A. Where indicated on Drawings, joints shall be flush threaded joints screwed with teflon thread lubricant. Threaded joints shall be prepared in conformance with manufacturer's written instructions.

B. Except where noted, PVC pipe shall be joined by solvent cementing.

C. Joining of pipes shall be in conformance with manufacturer's written instructions.

D. Flexible connectors below grade (buried) shall be Kanaflex Series 101-P5.

2.14 CONDUIT PROTECTION

A. Underground conduits penetrating interior floor slab of building conduits shall be provided including electrical, cable television and other at approximately with a Crouse Hinds Conduit Seal, EYS 1 Series, 18 inches above floor slab. Electrical conduits entering main switchboards on building exteriors and entering electrical panels on building interiors shall also be provided with EYS seal as specified in Other Execution Requirements Article of this Section.

2.15 TRENCH DAM MATERIAL

A. Cement and entonite slurry used for trench dams shall be a mixture of Type II Cement, powdered bentonite (Enviro Gel 200) and water.

2.16 BACKFILL

A. Refer to TRENCHING AND BACKFILLING Section.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive methane mitigation systems. Verify that clearing and grading of Project Site are completed prior to start of installation Work.

3.2 PREPARATION

A. Protect and guard excavations against danger to life, limb, and property as required by, but not limited to, Occupational Safety and Health Administration (OSHA) regulations.

B. Protect adjacent existing improvements including landscaping against damage.

C. Shore, crib, or lag excavations and earthen banks as necessary to prevent caving-in, erosion or gullying of sides.

D. Divert or dewater excavations until concrete or asphalt is placed, forms are removed, and backfilling is complete.

3.3 METHANE MITIGATION SYSTEM INSTALLATION AND STARTUP

A. Installation of methane mitigation system shall be performed under supervision of equipment manufacturer. Installer shall use shop drawings, flow diagrams, network communication sketches and functional matrices prepared by manufacturer to undertake installation activities. Manufacturer shall certify in writing that he has supervised installation, and that installation is in compliance with design.

B. Methane mitigation system manufacturer shall provide an experienced project engineer responsible for installation supervision, and start-up and commissioning of system.

C. Methane mitigation system shall be started up and commissioned only by manufacturer employed and trained personnel. Manufacturer shall have their manufacturing and support facilities within 75 miles of Project Site. Manufacturer shall maintain sufficient technical staff and parts inventory to support Project for 10 years after installation.

D. Methane mitigation system manufacturer shall provide on-site training to Department maintenance personnel when system is up and running. This manufacturer shall also have capability to offer a long-term support contract to Department for maintenance and routine calibration/validation of system in order to verify its proper functioning and address any maintenance issues.

3.4 SHORING

A. Provide shoring as necessary to properly and safely support earth sides of excavations, curbs, sidewalks, gutter, drives, and stairs, against movement and collapse. Shoring shall meet requirements of OSHA.

3.5 EXCAVATION

A. Provide excavation bottoms level and free from loose material. Excavate to indicated or required elevations of undisturbed earth.

B. Provide excavations free from standing water by pumping, draining, or providing protection against water intrusion. If soil becomes soft, soggy, or saturated, excavate to firm undisturbed soil and fill as required. Slope adjacent grades away from excavations to minimize entry of water.

3.6 IMPORT OR EXPORT OF MATERIALS

A. Provide fill materials as specified in this Section.

B. In addition to geotechnical sampling and testing described in Specification, import and export materials shall be sampled and tested for chemical constituents required by industry accepted profiling criteria.

3.7 BACKFILLING

A. Pipe trenches shall be backfilled in conformance with TRENCHING AND BACKFILLING Section.

B. Dispersion layer sand shall be placed and compacted in conformance with requirements of applicable Articles of this Section and Drawings.

3.8 COMPACTING

A. Compact fill and backfill material in conformance with TRENCHING AND BACKFILLING Sections.

3.9 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Notify Engineer 2 working days in advance of field tests. To ensure that there are no un-bonded seams, field seams shall be tested by Contractor in presence of gas mitigation engineer by either electric spark testing (Holiday Test) or pressurized air or vacuum box testing. Gas mitigation engineer shall have right to reject any field seam because of poor workmanship, defective welds, or insufficient overlap. Any field seams rejected for these reasons shall be repaired or replaced to satisfaction of gas mitigation engineer. Gas membrane shall be smoke tested as specified prior to placement of sand layer. Leaks identified during smoke testing shall be repaired to satisfaction of gas mitigation engineer.

2. Methane membrane shall be factory-tested; 1 sample per roll as per respective ASTM designation in applicable sub-section of this Section, and test results submitted to Engineer. Certificates of compliance shall be provided for each roll and include following parameters:

a. Thickness

b. Minimum tensile properties

c. Tear Resistance

d. Low temperature impact

e. Dimensional stability

f. Resistance to soil burial

g. Factory bonded seam strength parameters shall comply with values specified in this Section and "Standard No. 54, Flexible Membrane Liner" by NSF.

h. Smoke Testing Procedures: Notify Engineer 2 working days in advance of any smoke tests. Gas membranes shall be smoke tested in conformance with following procedures and certified gas tight by gas mitigation engineer prior to approval:

1) Gas membrane shall be visually inspected. Any apparent deficiencies or installation problems shall be corrected prior to smoke testing.

2) Date, time, address, building description, or identification, temperature, humidity, barometric pressure, wind speed/direction, and cloud cover shall be recorded by gas mitigation engineer on Smoke Testing Inspection Form. Ambient air temperature at time of testing shall be in excess of 25 degrees F and wind speed at ground level shall be 15 miles per hour (mph) or less.

3) Assemble and connect smoke testing system to subfloor vent riser (Alternative A) or configure smoke testing system to inject smoke beneath membrane through a temporary gas tight boot or sleeve attached to membrane (Alternative B). Only inert, non-toxic smoke shall be used for membrane smoke test.

4) Activate smoke generator/blower system at nominal 150 cfm to 450 cfm flow rate and 2-inch water column minimum duct pressure with vent riser outlet(s) uncapped. Minimum 2-inch water column duct pressure shall be measured at or near blower outlet. Continue to purge system for 60 seconds after smoke begins to emerge from vent outlet(s).

5) Cap vent outlet(s). Adjust smoke generator/blower control valve to maintain 1-inch to 2-inch water column over-pressure in vent piping system (Alternative A only). Blower or smoke generator system shall be capable of sufficient pressure and flow to induce slight (i.e., about 1/4 inch) lifting of membrane. Monitor membrane for lifting. Reduce pressure or flow rate if excessive lifting occurs.

6) Confirm adequate flow of smoke from injecting locations. Low rate of smoke flow may be indicative of poor communication between vent piping sand backfill and base of membrane for Alternative A (i.e., dirt placed above sand backfill). If low rate of smoke flow from coupon sampling location(s) occurs, use Alternative B described under Procedure No. 3 of this Article for smoke injection. Connect smoke generator to injection boot and continue with smoke injection. (Note: At least localized continuity of sand or gravel between vent lines and base of membrane shall be confirmed prior to membrane installation.)

7) Install a temporary seal at membrane sampling locations after purging using membrane product with GSE double-sided butyl-asphaltic tape or other procedure approved by gas mitigation engineer. Mark coupon-sampling location with fluorescent green paint. Repair sampling locations following completion of test.

8) Select one 0.05-inch perforation test location for every 1,000 square feet of membrane area up to a maximum area of 2,000 square feet and 1 additional perforation test location for every 5,000 square feet thereafter. Select representative test locations dispersed somewhat uniformly across surface of membrane. Perforate membrane at test locations using 0.05-inch pin. Confirm/photograph smoke emergence at each test location. Mark test locations with fluorescent green paint. Temporarily repair test locations after verification using HDPE tape or other material approved by methane mitigation engineer. Repair test perforations following completion of test.

9) Maintain operation of smoke generator or blower system for at least 15 minutes following purging of membrane. Thoroughly inspect entire membrane surface. Use fluorescent green paint to mark/label any leak locations. Mark or label leak locations on floor plan, which is to be included with Smoke Testing Inspection Form.

10) Repair leak locations marked in Procedure No. 9 of this Article.

11) Prepare smoke testing Inspection Form. Notes to include date, building description Name of gas mitigation engineer, name of person who performed test, number of leaks identified, distribution of leaks identified (i.e., tears, pin-holes or thin sections, seam leaks, boot leaks, etc.), and building floor plan with leak locations, coupon locations, and test perforation locations. Inspection Form is to be signed by gas mitigation engineer and inspector.

12) Install a permanent weatherproof tag on front-most vent riser confirming completion of smoke testing and approval of membrane. Tag shall include:

    a) "Smoke Tested OK"

    b) Disassemble/load smoke testing hardware. Confirm no equipment, materials, trash, and like, is left at Project Site.

i. Piping Flow Observation and Testing:

1) A smoke test shall be performed for methane collection piping system but prior to covering of piping and observations made of distribution of air (smoke) flow along perforated pipe sections. Prior to connection to vent risers, smoke shall be introduced to injection stream with blower operating and observations made of smoke flow from slotting piping in sub-slab systems. Distribution shall be such that adequate flow (as observed by smoke exiting perforations at a significant flow rate) occurs from along portions of slotted piping.

## 3.10 OTHER EXECUTION REQUIREMENTS

A. Any trenching, excavating, or other Work below grade is subject to gas infiltration from soil, which could create a potential hazard to personnel. Special safety precautions as follows shall be employed during this Work.

1. A combustible gas indicator shall be used at all times during trenching, excavating and system construction operations to detect presence of methane gas concentrations in and around Work.

2. If methane is detected at concentrations above 25 percent of Lower Explosive Limit (LEL) (i.e. 50,000 ppmv) Work shall immediately stop and area shall be evacuated. Work in area shall not recur until concentrations of methane concentrations are below 25 percent LEL. If required, an exhaust blower may be used to reduce or eliminate gas concentrations during trenching or system construction operations. Exhaust blower shall have an explosion proof motor and extension cord.

3. When trenching or excavating deeper than 2 feet or in presence of detectable concentrations of methane gas, operation equipment shall be fitted with spark-proof exhaust and foam fire extinguisher.

4. An exhaust blower may be used to reduce or eliminate methane gas concentrations during trenching or drilling operations. Exhaust blower shall have an explosion proof motor and extension cord.

5. Precautions shall be taken during welding operations to prevent sparks from contacting combustible gas mixtures.

6. Smoking shall not be permitted in any area that has not been designated as a "Smoking Area".

7. Dust control shall be provided during excavation Work.

8. Notify Engineer 2 working days prior to start of any construction of methane migration control systems, and an updated Project schedule shall also be provided Engineer.

9. Reference architectural and structural drawings to verify exact building dimensions and elevations.

10. Membrane installation shall be performed by a qualified firm with extensive experience installing the membrane specified. The number of membrane seams, splices, and laps made in the field shall be kept to a minimum.

11. The method of membrane installation, which includes jointing, seaming, and other physical connections shall be in conformance with the membrane manufacturer's written recommendations unless shown or noted otherwise on Drawings or specified in this Section.

12. Penetrations through the membrane shall be sealed conforming to the details shown on Drawings using prefabricated boots made up of the specific membrane material being used. Any existing conduits penetrating floor slabs that are not to be used shall be abandoned as follows:

    a. Cut off and remove the existing conduit (electrical duct banks, and the like) about 1 foot outside of the building footprint. Remove any wires, if present in conduits and block conduits with a minimum 3-foot cement slurry plugs. Once the conduits have been plugged, install a dam in the trench of the existing conduit adjacent to the exterior of the perimeter of the building foundation. The dam shall extend at least 4 feet from the exterior of the building and at least 12 inches below the bottom of the conduit. The trench dam shall be constructed of a minimum 4-foot continuous bentonite cement slurry consisting of a mixture of 26 percent Type II cement and 8 percent powdered bentonite.

13. Surfaces shall be trimmed smooth to the exact contours and elevations shown on Drawings. Loose earth, cobbles, wire tacks, and other foreign matter shall be completely removed.

14. Exercise care in placing and compacting the backfill material on top of the membrane. Backfill material shall be deposited on or pushed onto the membrane from a working edge in advance of any working equipment. No equipment shall be on the membrane without having at least 1 foot of backfill material under the wheels of any heavy equipment.

15. Forming for slabs, footings, shall be constructed in a way that is not supported by the membrane at any time. Foundation framing, rebars, and rebar chairs are not to be directly placed on the membrane.

16. Any necessary repairs to the membrane shall be patched with the membrane material itself, lap-jointed by a minimum of 4 inches.

17. Future Work that shall result in penetration of the membrane shall require approval from Engineer prior to any construction.

18. Warning signs shall be installed in prominent locations in the structure. The signs shall include the following information:

    a. "WARNING: This Building Is Protected With A Methane Gas Control Barrier. Any Proposed Penetration Or Alteration Of The Floor Slab Requires Notification Of The Building Official And Inspection By An Engineer".

19. The word "WARNING" shall be in white letters, a minimum of 3/4 inch high, and the remaining words shall be 1/28 inch high. Words shall be placed on a red background.

20. Electrical Conduits:

    a. Work described in this Paragraph is Division 26 Work but requirements are included in this Section for consistency with subsurface methane controls procedures.

    b. Electrical conduits shall be provided with seals as required by the appropriate sections of Article 501 of National Electrical Code (NEC) for Class 1, Division 1, Group D locations, wherever conduit transitions from below grade to above grade. (Refer to Electrical Seals on applicable Drawings).

    c. Application of NFPA 70 at Project:

        1) Class 1, Division 1 is an area where gas may be expected at least periodically;

2) Class 1, Division 2 is an area where gas would only occur if protection systems fail;

3) Class 1, Division 1 at Project is the area under or outside of the membrane. EYS fittings are required on any electrical conduit that (a) passes through the membrane into the structure; or (b) passes directly from the soil outside of the building footprint into structure.

4) Class 1, Division 2 at Project includes areas between the slab/foundation and the methane barrier. Electrical cable can be run through a Class 1 Division 2 area without EYS (y-seal) fittings, provided both of the following conditions are met.

a) The cable is enclosed in a gas tight sheath of metallic or nonmetallic material (i.e., plastic conduit is acceptable);

b) The run originates outside of a classified area (such as inside the structure), and terminates uninterrupted again outside of the classified area (such as inside the structure).

5) NFPA 70 requirements shall be met for Work in any classified area, given the above classifications at Project.

21. General Electrical Controls Requirements:

a. Materials furnished under Contract shall be of the highest grade available, free from defects, and imperfections, of recent manufacture, and unused.

b. Items of the equipment shall be the product of a manufacturer experienced in the design, and operation of the equipment for the purpose required, and said manufacturer shall have established a record of successful operation of such equipment manufactured or produced by them.

c. If necessary, modifications shall be made to manufacturer's standard product to make it conform to specific requirements of Specifications and to requirements contained in regulations by public agencies. Such modifications shall be noted in shop drawing submittals.

d. A brass or stainless steel nameplate shall be attached to equipment with following information plainly marked on nameplate:

1) Name and address of manufacturer;

2) Serial number; and

3) Any other information necessary for complete identification of item of equipment.

22. Utility Trench Dams:

a. Install a gas migration barrier in utility trenches that extend beneath building(s) foundation from areas outside perimeter of building(s).

b. Install gas migration barrier in any utility trench immediately adjacent to exterior perimeter of building(s) foundation. Dam shall extend for a distance of at least 5 feet from perimeter of structure and at least 6 inches above bottom of perimeter footing to base of trench.

c. Gas migration barrier shall consist of 1 of following:

1) A minimum 2-foot continuous length of slurry consisting of a mixture of 26 percent Type II cement, 8 percent powdered bentonite and 66 percent water by weight. Slurry shall extend from bottom of trench to a level of 6-inches above base of adjacent footing.

2) A minimum 5-foot continuous length of native soil backfill compacted to at least 90 percent relative compaction in conformance with ASTM D1557 testing procedures. Compacted soil backfill shall extend from bottom of trench to a level at least 6 inches above base of adjacent footing.

23. General Notes:

a. Verify locations of existing utilities, drainage and irrigation lines in area. Unless shown otherwise on Drawings, existing utilities shall be left in place and conduct operations in such a manner that utilities are protected at all times. In a case where utilities are damaged, replace damaged utilities to their original locations or as directed by Engineer, at Contractor’s sole cost and expense.

b. Dispose of surplus materials, waste products and debris, and make necessary arrangements for such disposal.

c. Contractor shall solely be responsible for furnishing, erecting, maintaining, and removing protecting barriers (construction fencing), signs, temporary lighting, and like, required for protection of persons and property.

d. Any trenching, excavation, or other Work below grade is subject to gas infiltration from soil, which could create a potential hazard to personnel. Special safety precautions shall be employed during this Work and shall include:

1) Smoking shall not be permitted in Work area.

3.11 CLEANING

A. Remove and legally dispose of rubbish, debris, and waste materials from Project Site.

3.12 PROTECTION

A. Protect Work of this Section until Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Scope of Work:

1. Dewatering excavations

2. Department shall not obtain a NPDES (National Pollutant Discharge Elimination System) Permit for dewatering. If Contractor chooses to dewater, Contractor shall be responsible for obtaining NPDES Permit, paying for fees, complying with the requirements, and ensures no impact to the schedule.

3. Dewatering activities not subject to a separate NPDES permit shall comply with NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit) Order WQ 2022-0057-DWQ NPDES No. CAS000002 (CGP). Activities such as mechanical pumping or syphoning of non-potable water from sources including but not limited to: excavations, trenches, foundations, vaults, groundwater removal specifically related to the construction activities, or water collected in impoundments (ponds, puddles, low points on the active site, or other similar accumulation points).

B. For Work shown on Drawing No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

1.2 RELATED SECTIONS

A. Section 33 40 01 - Storm Drainage

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for dewatering shall be paid under the Parking Lot Dewatering and Bridge and Site Dewatering bid items of Bid Proposal Line Items.

1.4 SUBMITTALS

A. Submit to Engineer for approval, a schedule for dewatering operations and a list of proposed methods and equipment.

1.5 PROJECT SITE CONDITIONS

A. Contractor shall expect to dewater 600 gallons per minute (GPM) and assume water is hazardous for bidding purposes.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide an adequate dewatering system for the control of surface, ground, and sea water in the trench excavations and elsewhere in Project as may be necessary during the construction period. Keep excavation dry during construction operations. Keep water table 1 foot below the bottom of the excavation until backfill has been completed.

B. Water extracted by the dewatering shall be disposed of by Contractor off Department property in such a manner as shall not damage public or private property or create a nuisance or health menace.

C. De-silt the water before discharging water.

D. California State Water Resources Control Board (CSWRCB) classifies water used in construction as construction wastewater, the disposal of which is subject to Attachment J of CGP. Comply with requirements in Attachment J for discharge and monitoring of wastewater as issued by CSWRCB.

E. Except for shut downs for maintenance of dewatering equipment, no interruptions in the dewatering system procedures shall be permitted during excavation and construction operations. Provide full-time surveillance and maintenance, 24 hours per day, to avoid breakdowns.

F. Where possible, Contractor shall avoid removing groundwater from excavations.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Trench excavation and backfill operations

B. Trench excavation and backfill Work includes excavation, backfill, and compaction of utility trenches.

## 1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 02 61 14 - Excavating, Stockpiling, and Disposing of Chemically Impacted Soil

C. Section 31 50 01 - Excavation Safety Requirements

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Costs for trench excavating, backfilling, and surfacing including but not limited to sewer, storm drain, water, electrical, communications, gas, and oil pipeline trenches, shall include pavement sawcutting; asphalt concrete and concrete removals; excavation; soil backfill; slurry where used as backfill; removal and disposal of excavation spoils off of Department property; compaction; repeated compaction tests after failures; and asphalt concrete and concrete trench resurfacing, and shall be payable as follows:

    a. Trenches in areas of existing pavement: Trench excavation, backfill, and surfacing shall be paid under the corresponding Lump Sum Construction bid items of Bid Proposal Line Items.

    b. Trenches in areas of new, full depth asphalt concrete pavement, concrete pavement, and existing pavement to be overlaid with new pavement: Trench excavation and backfill shall be paid under the corresponding Lump Sum Construction bid items of Bid Proposal Line Items. Asphalt concrete trench surfacing shall be paid under Asphalt Concrete Pavement bid item of Bid Proposal Line Items.

2. The quantity of trench subgrade stabilization material in excess of trench depths required for Work where trench subgrade is saturated, and is unsuitable as substrate for trench bedding, as determined by Engineer, shall be measured as the volume of over-excavated native material. This quantity shall be paid for under the Trench Subgrade Stabilization (Contingency Item) bid item of Bid Proposal Line Items at the unit price per cubic yard of trench subgrade stabilization material. Costs for excavating, handling, transporting, and disposing of the unsuitable material and purchasing, delivering, and placing the stabilization material shall be included in the bid item's unit price per cubic yard for trench subgrade stabilization material.

## 1.4 REFERENCES

A. ASTM C535 - Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

B. Reference Specifications (RS):

Section 200 - Rock Materials

Section 201 - Concrete, Mortar, and Related Materials

Section 217 - Bedding and Backfill Materials

Section 301 - Subgrade Preparation, Treated Materials, and Placement of Base Materials

Section 306 - Open Trench Conduit Construction

C. Standard Plan – City of Los Angeles Department of Public Works:

S-251-1 - Pipe Laying in Trenches

## 1.5 QUALITY ASSURANCE

A. Engineer reserves the right to approve each material to be used in construction. Do not use material which, after approval, in any way becomes unfit for use.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Slurry backfill shall be as specified in BASIC SITE MATERIALS AND METHODS Section.

B. Backfill shall consist of native material in conformance with RS Subsections 306-12.1 and 306-12.3, unless noted otherwise on Drawings.

1. Imported trench backfill, where required on Drawings or in Specifications, shall conform to RS Subsection 217-2.2 and the requirements of BASIC SITE MATERIALS AND METHODS Section.

2. Sand shall conform to RS Subsection 200-1.5.1.

C. Additional trench subgrade stabilization material shall conform to RS Subsection 200-1.2 and 1 of the 2 following gradations as indicated on Drawings or as directed by Engineer:

1. RS Table 200-1.2.1 (A), 1 inch nominal gradation

2. The following 2 inch nominal gradation:

| Sieve Size (inches) | Percent Passing |
|---|---|
| | |
| 2 1/2 | 100 |
| 2 | 90-100 |
| 1 1/2 | 30-60 |
| 1 | 0-20 |
| 1/2 | 0-5 |

a. Gradation sample shall not exceed 30 percent loss by weight at 1,000 revolutions as performed under ASTM C535. Sample shall be assumed to correspond most nearly to ASTM C535, Gradings of Test Samples Table, Grading 2.

D. Contractor may elect, at its option, to use slurry as stabilization material.

## PART 3 - EXECUTION

### 3.1 EXCAVATION

A. Pavement removals shall conform to BASIC SITE MATERIALS AND METHODS Section.

1. Except as noted otherwise on Drawings, existing asphalt concrete thickness varies throughout Project Site. Assume for bid purposes 12 inches for existing pavement thickness.

B. Excavation shall conform to RS Subsection 306-3 unless otherwise specified or shown on Drawings.

C. Perform excavations for pipe laying or conduit in accordance with Standard Plan S-251-1 unless otherwise detailed on Drawings.

D. Perform trench excavations in conformance with EXCAVATION SAFETY REQUIREMENTS Section.

E. Excavate to the depths shown on Drawings or as necessary for the installation. After the excavation is completed, notify Engineer for approval of excavation subgrade.

F. Remove interfering portions of abandoned substructures and abandon remaining substructures in place in conformance with BASIC SITE MATERIALS AND METHODS Section.

G. Positively determine the location and elevation of substructures containing hazardous or unstable substance installations prior to excavation in conformance with EXCAVATION SAFETY REQUIREMENTS Section.

H. Maintain excavation trench wall stability during construction in conformance with EXCAVATION SAFETY REQUIREMENTS Section. Remove material that slides into the excavation.

I. Trench excavation spoils not used as backfill shall become property of Contractor and shall be disposed of off Department property regardless of type of backfill material specified.

### 3.2 CHEMICALLY IMPACTED SOIL

A. Handle unexpectedly discovered chemically impacted soil in conformance with EXCAVATING, STOCKPILING, AND DISPOSING OF CHEMICALLY IMPACTED SOIL Section.

## 3.3 BACKFILL AND COMPACTION

A. Place slurry backfill in conformance with RS Subsection 306-12.2, except that trench width, bedding, and backfill depths shall be as shown on Drawings.

## 3.4 HIGH VOLTAGE CONCRETE ENCASEMENT

A. Refer to BASIC SITE MATERIALS AND METHODS Section.

## 3.5 TRENCH SUBGRADE STABILIZATION MATERIAL

A. Once the bottom of trench excavation has been reached, obtain Engineer’s analysis of soil that appear saturated or that may be unsuitable as a support for trench bedding.

1. Upon Engineer's authorization, perform trench subgrade stabilization in conformance with RS Section 306, to the depth directed by Engineer except that replacement bedding material shall conform to 1 of the 2 gradations specified in Paragraph 2.1C of this Section.

2. Dispose of unsuitable soil off Department property.

B. Measurement and payment shall be made in conformance with Price and Payment Procedures Article of this Section.

C. Refer to appropriate Section listed in Related Sections Article of this Section for trench bedding requirements.

## 3.6 REPAIR AND RESTORATION

A. Refer to BASIC SITE MATERIALS AND METHODS Section for surface improvements not designated to be permanently removed but which were removed or damaged as a result of Contractor's operations.

## 3.7 FIELD QUALITY CONTROL

A. Refer to BASIC SITE MATERIALS AND METHODS Section Field Quality Control Article, for Engineer's determination of maximum dry density and optimum moisture content, and for field-testing of compacted backfill.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Dust and erosion control agent

## 1.2 RELATED SECTIONS

A. Section 31 00 00 - Earthwork

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the corresponding Lump Sum Construction bid items of Bid Proposal Line Items.

## 1.4 SUBMITTALS

A. Submit the following to Engineer for approval:

1. Product Data:

a. Product name and type, technical data, and specifications, including active solids content, handling, storing, mixing, and application instructions.

b. Manufacturer’s name, address, telephone number, and contact person.

c. Safety data sheet (SDS).

2. Proposed method of applying product including application equipment.

3. Proposed application rate of product.

# PART 2 – PRODUCTS

## 2.1 MATERIALS

A. Material shall be acrylic copolymer, water soluble, consisting of at least 30 percent active solids content or better, Envirotac II as manufactured by Environmental Products and Applications, Inc., (760) 777-8035.

1. Water: Fresh water

## PART 3 – EXECUTION

### 3.1 APPLICATION

A. Surface Preparation: In conformance with manufacturer's written instructions.

B. Dilution: In conformance with manufacturer's written instructions.

C. Placement: In conformance with manufacturer's written instructions.

D. Apply dust and erosion control agent uniformly and in conformance with manufacturer's written instructions.

E. Do not apply dust and erosion control agent in rain, mist, or temperatures below manufacturer's written instructions.

F. Application Rate (Non-Traffic):

1. For Slopes or Stockpiles (stabilization, dust control, sediment, and erosion control): Use 275 gallons of dust and erosion control agent mixed with 6 parts water per acre.

2. For Flat Areas: Use 125 gallons of dust and erosion control agent mixed with 8 parts water per acre.

### 3.2 CLEANING

A. Remove excess material from Project Site and dispose of in conformance with manufacturer's material safety data sheet and written instructions.

### 3.3 PROTECTION

A. Protect application in conformance with manufacturer's written instructions.

END OF SECTION

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Excavating and trenching requirements in conformance with State of California Construction Safety Orders issued by Division of Occupational Safety and Health during the course of excavating and trenching Work.

### 1.2 RELATED SECTIONS

A. Section 02 61 14 - Excavating, Stockpiling, and Disposing of Chemically Impacted Soil

### 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires excavating and trenching requirements.

### 1.4 SUBMITTALS

A. Prior to excavating 5 feet or more in depth, submit to Engineer for review detailed drawings showing the design of shoring, bracing, sloping, or other provisions for worker and property protection.

1. Indicate design criteria, limits of shored areas, sequence of placement and removal, and shoring system details.

## PART 2 - PRODUCTS

### 2.1 DESIGN AND CONSTRUCTION REQUIREMENTS

A. If such Drawings vary from the shoring system standards established by Construction Safety Orders for State Division of Occupational Safety and Health, Drawings shall be prepared and signed by a State of California registered civil or structural engineer.

B. The use of a protective system less effective than that provided by Construction Safety Orders shall not be permitted.

C. Contractor shall provide more extensive shoring or bracing systems than those required by Construction Safety Orders when required by conditions shown on Drawings, or in Specifications, or encountered in the field.

D. Refer to SITE CONDITIONS Section for geotechnical information required in the preparation of shoring design.

E. Where excavation alignments are within 10 feet of existing buildings, streets, tanks, or other structures requiring shoring, shoring design shall accommodate surcharge loads imposed on the structure or a minimum equivalent of 2 feet in height of earth added to the active earth pressure in the upper 10 feet of shoring, whichever is greater.

PART 3 - EXECUTION

3.1 PREPARATION

A. Do not begin excavation Work until shoring drawings are reviewed by Engineer.

3.2 PROTECTION

A. Exercise caution when excavating near flammable, high pressure, or high voltage substructures and conduits.

B. Prior to excavating adjacent to and within 6 feet of an existing subsurface installation carrying a hazardous or unstable substance, excavate potholes in conformance with Section 62.03.1 (Notification and Location Requirements) of Los Angeles Municipal Code and positively determine the location and elevation of the subsurface installation.

END OF SECTION

# PART 1 – GENERAL

## 1.1 SECTION INCLUDES

A. Prestressed concrete piles

B. Staylath

C. Permit requirements to transport prestressed concrete piles

## 1.2 RELATED SECTIONS

A. Section 02 41 13 - Selective Site Demolition

B. Section 31 62 14 - Concrete Indicator Pile Testing

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. General:

a. Engineer shall measure Work or review Contractor’s measurements of Work and decide upon the correct quantity. Contractor shall cooperate with Engineer in making measurements.

b. Payment shall constitute full compensation for transportation, labor, materials, permits, and equipment required or specified to complete Work of this Section.

c. Piles shall be paid for under appropriate bid items of Bid Proposal Line Items for piles.

d. Some Work in this Section shall be considered incidental to the completion of Work of this Section. Cost of such incidental Work shall be considered to be included in the appropriate bid items and no separate or additional compensation shall be allowed. Incidental Work shall include, but is not necessarily limited to:

1) Conferring between Engineer and Contractor.

2) Marking the piles.

3) Lifting off the hammer and helmet assembly during driving to observe deviations.

4) Work necessary for measurement of pile location and inclination.

5) Monitor and record pile driving data and provide specified data to Engineer.

6) Pre-drilling as necessary.

7) Mobilization and demobilization of pile-driving equipment for or during the indicator pile program and as required to meet the restrike periods shown on Drawings.

8) Survey Work.

2. Furnish 24-Inch Octagonal Concrete Piles:

a. Quantities of 24-inch octagonal long concrete piles furnished shall be measured as the cumulative number of linear feet of piles authorized by Engineer, supplied by Contractor, and accepted by Engineer. No measurement shall be made for unused concrete piles (except for those specifically ordered as surplus), piles broken during handling, transporting, installing, or otherwise not requested by Department.

b. Progress payments shall be made based on pile when stockpiled on Project Site, ready for installation.

c. Items considered incidental in the cost of furnishing the piles include, but are not limited to:

1) Pile cushions.

2) Other incidental items previously specified in this Section.

d. Contractor shall confirm in writing Engineer’s order for surplus piles and shall be paid based on the unit price per foot of piles actually delivered to Project Site.

e. Payment shall include costs to manufacture, transport, store, and handle 24-inch octagonal prestressed concrete piles.

f. Payment shall include costs for City of Los Angeles Department of Public Works, Bureau of Street Services Overload permits, inspections, pilot vehicles, and other costs associated with transporting piles to Project Site.

3. Install 24-Inch Octagonal Concrete Piles:

    a. Quantities of 24-inch octagonal concrete piles installed shall be measured as the number of piles installed by Contractor and accepted by Engineer. No measurement shall be made for concrete piles installed as replacements for damaged or misplaced piles, and piles broken during handling, installing, or otherwise not requested by Engineer, unless such problems occurred due to encountering an obstruction.

    b. Payment for installation of 24-inch octagonal concrete piles shall be made on the basis of the unit price per each stated in Bid Proposal Line Items. Payment shall include full compensation for materials, equipment, labor, transportation, handling, and associated services required to install and cut off the piles up to 6 feet.

    c. No payment shall be made for installation when a pile is driven out of tolerance unless the deviation is due to an obvious obstruction. Engineer shall evaluate out of tolerance piles for acceptance.

        1) If the pile is acceptable, and tolerance deviations are determined not to be due to Contractor’s error, compensation shall be made if modifications to deck slab or additional reinforcing are required.

        2) If the pile is acceptable, and tolerance deviations are due to Contractor’s error, payment shall be made for the pile under the appropriate bid item but no compensation shall be made if modifications to deck slab (including redesign) are required or additional reinforcing is required.

        3) If the pile is unacceptable, and tolerance deviations are not due to Contractor’s error, remove and replace pile. The cost for removing and replacing the pile shall be paid under the appropriate bid items of Bid Proposal Line Items. Refer also to the Break Off and Dispose Of 24-Inch Octagonal Concrete Production Piles Paragraph of this Article.

4) If the pile is unacceptable and tolerance deviations are due to Contractor's error, costs associated with modifying deck slab (including redesign Work), adding reinforcing, and removing and replacing piles that are out of tolerance shall be at Contractor's sole cost and expense.

5) Contractor may attempt to correct out-of-tolerance pile alignments, however, no compensation shall be made for such course of action for any production pile or previously installed indicator piles. Pulling of piles is prohibited.

d. Payment shall include costs for 3 attempts to drive, remove, realign, and re-drive piles if piles wander more than 6 inches during the first 10 to 20 feet of driving. No additional payment shall be made for this Work.

4. Restriking 24-Inch Octagonal Concrete Production Piles (Contingency Item):

a. Restriking of any pile requested by Engineer shall be compensated as specified in this Section, regardless of the outcome of the restrike testing.

b. The quantity of piles restruck shall be measured as the number of restrike tests requested by Engineer and completed during production pile driving. One or more restrike tests shall be paid under the appropriate bid item of Bid Proposal Line Items.

c. Payment for restrikes shall be made based on either the unit price for restriking with PDA or the unit price without PDA. Costs shall include mobilization or remobilization of pile driving equipment to the pile to be restruck, setup of PDA instrumentation as required, performing the restrike, and remobilization of the pile driving equipment to the location of production pile driving.

d. Items considered incidental to restriking piles include, but are not limited to:

1) Moving pile driving rig to piles selected for restriking.

2) Providing correct alignment of pile hammer and pile.

3) Measuring location of pile and completion of restrike.

4) Performing CAPWAP analysis on pile restrike requiring PDA as directed by Engineer.

5. Spudding of Obstructions (Contingency Item):

   a. This bid item shall include costs for removal and re-driving of the pile and spudding of the obstruction.

   b. Driving of additional piles, if necessitated by the inability to remove the obstruction, shall be paid based on the appropriate bid item for indicator pile or production pile installation as appropriate.

   c. Measurement for spudding of obstructions shall be for each obstruction at which spudding was attempted.

   d. Payment shall be made for each pile location authorized by Engineer at which spudding was attempted and shall be for labor, transportation, materials, equipment, and incidentals necessary to perform the operation.

6. Concrete Pile Buildups 4 Feet or Less in Height (Greater than 6 inches) (Contingency Item):

   a. Buildups shall be compensated only if lengths of piles were based on driving criteria and approved by Engineer and were installed at specific locations and driving conditions approved by Engineer.

   b. Payment under a unit price bid item shall be made for buildups greater than 6 inches and less than 4 feet in height.

   c. Payment for buildups shall be made only when independent casting of the buildup is required. Monolithically cast buildups shall not be compensated.

   d. Measurement for buildups shall be the actual number of independent buildups constructed.

7. Buildups greater than 4 feet in height and no more than 7 feet in height shall be compensated in the same manner as concrete pile buildups 4 feet or less in height (greater than 6 inches).

8. Break Off and Dispose of 24-Inch Octagonal Concrete Production Piles (Contingency Item):

    a. Quantities of broken off and removed piles shall be the number of piles installed that are broken off and removed after installation as directed by Engineer and disposed of off Department property. Items considered incidental to removal of piles include, but are not limited to:

        1) Measurement of length, location, and documentation of pile segments remaining at Project Site after removal.

        2) Diver Work required to affect appropriate removals.

    b. Refer to Field Quality Control Article of this Section concerning Department diver inspection of the top of the remnant pile segment.

    c. Payment shall be based on the unit price, per each, stated in Bid Proposal Line Items.

9. Cut Off and Remove Pile Cut Offs Over 6 Feet Long (Contingency Item):

    a. Quantities of pile cut offs exceeding 6 feet in length shall be the number of cut offs from installed piles with length exceeding 6 feet disposed of off Department property. Length measurement shall be performed in the presence of Engineer.

1.4 REFERENCES

A. ACI PRC-347 - Guide to Formwork for Concrete.

B. ASTM A416/A416M - Standard Specification for Low-Relaxation, Seven-Wire Steel Strand for Prestressed Concrete.

C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

D. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

E. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.

F. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

G. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

H. ASTM C88/C88M - Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.

I. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

J. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.

K. ASTM C150/C150M - Standard Specification for Portland Cement.

L. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

M. ASTM C470/C470M - Standard Specification for Molds for Forming Concrete Test Cylinders Vertically.

N. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.

O. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

P. PCI MNL-116 - Manual for Quality Control for Plants and Production of Structural Precast Concrete Products.

Q. Reference Specifications (RS):

Section 200 - Rock Materials

Subsection 200-1 - Rock Products

Section 201 - Concrete, Mortar, and Related Materials

Subsection 201-1 - Portland Cement Concrete

Subsection 201-2 - Reinforcement for Concrete

Subsection 201-3 - Expansion Joint Filler and Joint Sealants

Subsection 201-4 - Concrete Curing Materials

Section 303 - Concrete and Masonry Construction

Subsection 303-1 - Concrete Structures

## 1.5 DEFINITIONS

A. General: Definitions apply to this Section as well as the pile driving criteria developed during execution of Contract.

B. CAPWAP (Case Pile Wave Analysis Program): A rigorous numerical analysis, which models the pile and soil behavior that allows full and accurate analysis of pile driving analyzer (PDA) field data.

C. Elevation: Measurement of vertical distance from mean lower low water (MLLW).

D. Fixed Leads: Leads that are pinned to or suspended from the crane boom at the top and equipped with a hydraulic spotter at the bottom capable of spotting the pile to its correct position and maintaining alignment during driving. The degree of the fixed leads' rigidity and strength shall be subject to Engineer's review. Contractor shall maintain operability and safety of this equipment, regardless of Engineer review.

E. Impact Stress: The stress transferred to the pile head at impact from the driving train, as determined from measurements using PDA.

F. Indicator Piles: Refer to CONCRETE INDICATOR PILE TESTING Section.

G. Obstruction: A solid object impenetrable by driven piles and not visibly or otherwise easily detectable, such as a buried boulder or other large object. A sudden increase in penetration resistance and deviation from tolerances result from piles hitting obstructions.

H. PDA (Pile Driving Analyzer): PDA measures pile vibration during driving for strength and resistance of pile in soil.

I. Pile Tip: Bottom end of pile. Synonymous with pile toe.

J. Pile Top: Top end of pile. Synonymous with pile head.

K. Practical Refusal Resistance: The point at which it is not reasonable to continue driving a particular pile. Practical refusal is defined as a penetration resistance of at least 150 blows per foot for 1 foot, a penetration resistance of at least 80 blows for 6 inches, or a penetration resistance of 25 blows for 1 inch, whichever comes first. The practical refusal penetration resistance shall apply only for hammer sizes approved by Engineer when the hammer is operating as specified.

L. Rated Hammer Energy:

1. For diesel hammers, the product of the maximum rated stroke times the ram weight. Units: kip-foot.

2. For hydraulic hammers, the product of the maximum rated equivalent stroke times the ram weight. Units: kip-foot.

M. Pile Driving Criteria: Based on the test pile resilts, Engeineer shall develop pile driving criteria that shall include minimum blow count requirements to achieve pile capacity, minimum pile embedment depth and maximum blow count to mitigate pile damage due to hammer impact energy during driving.

N. Restriking: Positioning the driving train and driving an already installed pile after some nominal waiting period (as specified) after initial installation. This definition applies to piles selected by Engineer for determining appropriate driving criteria requirements or for checking pile capacity or integrity. Restriking may require mobilizing the pile-driving rig from 1 pile to another at opposite end of the structure. Dynamic monitoring may be required by Engineer during pile restriking.

O. Set: Pile penetration in inches per blow.

P. Sweep: Deviation from straightness measured along each of 2 perpendicular faces of the pile while not subject to bending forces.

Q. Termination Penetration Resistance: The penetration resistance (blow count) at which driving may be terminated, as established by Engineer. Termination criteria shall consider depth of embedment of the pile, energy of the hammer, resistance to penetration, and other factors.

R. Test Cylinder: A cylindrical concrete test specimen representative of concrete from which piles are cast. To be representative of the pile’s concrete, test cylinders shall be cast from the same pour as the piles they represent and shall be cured initially with the piles under the same sun, wind, humidity, and temperature exposure at the same location.

S. Testing Laboratory: City of Los Angeles Harbor Department Testing Laboratory or a Department-approved laboratory. Tests performed by Department Testing Laboratory (Test Lab) shall be at no charge to Contractor.

T. Transferred Hammer Energy: The energy transferred to the pile head at impact from the driving train as determined from measurements using PDA.

## 1.6 ADMINISTRATIVE REQUIREMENTS

A. Scheduling: Schedule pile driving to occur between the hours of 7 am and 5 pm Monday through Saturday.

## 1.7 SUBMITTALS

A. Concrete Mix Design Submittals:

1. Proposed concrete design mixes including available test data for approval and required testing at least 30 Calendar Days before scheduled use in Project.

2. A trial batch of concrete shall be made, and test cylinders from the batch shall be submitted to Test Lab for each proposed concrete mix design. Each mix design shall be required to achieve a minimum compressive strength of 6,500 pounds per square inch (psi) at 28 days.

3. Certification that the aggregates meet the recommendations of ASTM C33/C33M, Appendix XI for reactivity.

4. Certification that the aggregates meet the soundness requirements of ASTM C33/C33M when tested in conformance with the requirements of ASTM C88/C88M using a sodium sulfate solution.

5. Certification that fly ash meets RS Subsection 201-1.2.5, Type F and ASTM C618.

6. Certification on admixtures to be used in Project.

7. Manufacturer’s certification for curing compound. Manufacturer’s certification shall state quantity or coverage required to meet or exceed tests, surface texture of concrete, and method of application and shall include tests for compliance performed by manufacturer. Certification shall further stipulate that product meets ASTM C309 and additional permeability requirement described in Materials Article of this Section. Manufacturer shall also specifically state the coverage required to meet these requirements.

B. Reinforcing Steel Submittals:

1. Mill test reports certifying that materials meet specified American Society for Testing and Materials (ASTM International) requirements.

2. Before fabricating materials, submit shop drawings to Engineer for review showing bending diagrams, critical dimensions to ends of bars, including complete information for placing reinforcing and accessories, minimum concrete cover, lap splice length, and locations, and minimum spacing between bars. Do not scale dimensions from Drawings, or use Drawings for shop drawings.

3. Two copies of the reviewed and corrected reinforcing steel shop drawings including the list of the reinforcing steel before the placing of reinforcing steel is started.

C. Manufacturer’s certificate attesting that structural metals comply with Specifications.

D. Manufacturer’s certificate for each nonmetallic component to be included in Work attesting that materials comply with this Section.

E. Pile Manufacturing, Handling, and Installation Submittals:

1. Complete description of methodology of curing, transfer of prestress, and handling. This shall include a description of thermo couple probes and their placement procedure.

2. List of equipment, methods, and procedures for manufacturing, transporting, handling, lifting, driving, and cut off, if required, of piles.

3. Calculations and shop drawings for piles showing placement of steel, the use of standard or special embedded lifting devices, the employment of pickup points, or other methods of pickup. Handling stresses shall include a minimum of 50 percent impact factor. The use of prestressing strand or cable loops projecting from the concrete shall not be allowed. If standard embedded lifting devices, like threaded inserts, interfere with the jet tube, use special proprietary lifting devices that do not interfere with the jet tube location. At least 10 working days before casting piles, submit a lifting device designed and signed by a civil engineer registered in the State of California to Engineer for approval. Under no circumstances shall handling be allowed to generate detrimental tensile stresses in the pile. Net tensile stresses resulting from handling shall not exceed 3 times square root of f'c. Deviation from Drawings pertaining to length of pile, design, or other deviation, if any, shall be shown on shop drawings. Calculations shall clearly demonstrate that such deviations shall not jeopardize the structural integrity of the pile. Shop drawings shall show that the steel layout and details conform with that shown on the structural design drawings and shall be signed by a civil engineer registered in State of California with a minimum of 5 years experience in pile handling.

4. Where templates are to be used for driving piles, submit shop drawings detailing the proposed templates to Engineer for review. Regardless of review, Contractor shall maintain complete responsibility for operability and safety of the required equipment. Contractor shall not use templates unless approved by Engineer.

F. Staylath Submittals:

1. Detailed shop drawings and calculations for the staylath system, including tie back system where required by Contractor, shall be prepared and signed by a qualified professional engineer registered in State of California with 5 years experience on waterfront projects and shall be furnished by Contractor to Engineer.

G. Quality Control Submittals:

1. Drawing showing an identification number for each pile with pile location prior to pile manufacture.

2. Completed Pile Hammer Data Sheet, attached at the end of this Section for the hammer proposed for use on Project. For hammers with variable rated hammer energy output, also supply manufacturers operating data and rated hammer energy at each fuel or energy setting.

3. Manufacturer's specifications of products and maintenance manuals for the pile hammer and auxiliary equipment.
4. Certificates of compliance, mill certificates, samples, and test results for prestressing steel, spirals, non-prestressed reinforcing steel, pile anchorage steel, void form material, and other embedded items.
5. Certificates of compliance, samples, and test results for cement, aggregates, and admixtures.
6. Certificates of jack calibration curves used in prestressing. Certificates shall be traceable to NIST.
7. Description of plant quality control procedures demonstrating substantial compliance with PCI MNL-116.
8. Complete and submit daily, logs of piles driven, including the following:
    a. Pile number, length, and casting date.
    b. Elevation of mudline before and after driving.
    c. Depths of penetration.
    d. Pile tip and cut off elevations.
    e. Penetration resistance, hammer fuel setting, average ram stroke or energy for each foot of driving over entire pile length.
    f. Date driven, name of Contractor-supplied observer and Department Inspector.
    g. Equipment used.
    h. Installation Method: Description of method shall include, times, dates, hammer fuel or energy settings, and hammer stroke.
    i. Saximeter data and plots.
    j. Other pertinent pile driving behavior or behavior after release from the leads.

H. Methods proposed to measure pile position and inclination after installation is complete and the piles are free from any restraint from driving template and the hammer and driving train leads. Submittals shall be made at least 30 Calendar Days prior to pile driving.

I. Submittals Made During Pile Driving: Submittals shall be made on a daily basis and within 24 hours of when data was obtained.

1. Required observations made during pile installation for each production pile.

2. Required information on pile location surveys for each production pile as required in SURVEYING AND FIELD ENGINEERING Section.

3. Procedures used to spud piles.

4. Locations of piles that were cut off and removed.

J. Submittals Made After Pile Driving:

1. Results of surveys in a report format no later than 10 Calendar Days after completion of pile driving.

K. Contract Closeout Submittals:

1. Original tracings or acceptable reproductions of final shop drawings showing deviations of details for piles furnished in conformance with PROJECT RECORD DOCUMENTS Section.

1.8 QUALITY ASSURANCE

A. Quality assurance procedures shall conform to PCI MNL-116.

B. Pile fabricator shall have at least 5 years of experience in manufacturing precast, prestressed concrete piles. Fabricator shall be an approved fabricator by City of Los Angeles Department of Building and Safety (LADBS).

C. Pile driving contractor qualifications: Competent pile driving contractor specializing in placement of concrete piles.

1. Experience: 5 years experience driving concrete piles in a marine environment.

D. Tests:

1. Contractor shall provide and pay for testing and certification except that which is indicated in this Section to be provided by Test Lab.

2. Test Lab shall perform the following services:

a. Test fine and coarse aggregate for conformance with RS Subsections 200-1.4 and 200-1.5.3, respectively.

b. Review Contractor's proposed mix designs.

c. Perform concrete compressive strength tests.

3. Evaluation of strength tests of trial batches shall conform to RS Subsection 201-1.1.3, except that the minimum cement content required therein does not apply and trial batches shall not be placed in Work. Trial batches and related testing, if required, shall be provided by Contractor.

4. To facilitate testing, Contractor shall comply with the following:

   a. Provide and deliver to Test Lab, representative samples of materials which require testing and are proposed to be used in Project.

   b. Submit proposed concrete mix design to Engineer for review. Also submit a trial batch for testing.

   c. Furnish the experienced technicians and equipment necessary to obtain and handle the samples at Project Site or at other locations where materials are located.

   d. Advise Test Lab 72 hours in advance of the beginning of operations to allow time for completion of quality tests and for assignment of laboratory personnel.

   e. When requested, furnish copies of test reports of shipments of cement to Engineer and Test Lab.

   f. Transit mixed concrete shall comply with RS Subsection 201-1.4.3 and ASTM C94/C94M.

5. Concrete Specimen Test Cylinders: Contractor shall make for Department, four 6-inch diameter by 12-inch test cylinders for each pile manufactured. A minimum of 8 test cylinders shall be made for each day’s pour, regardless of cubic yardage, or for each change in mix design.

   a. Contractor shall also make test cylinders for testing the concrete strength at transfer of prestress. As a minimum, Contractor shall make 4 test cylinders from each end of the casting bed for this purpose.

   b. Test cylinders shall be produced by an American Concrete Institute (ACI) certified technician.

c. Perform 24 hour initial cure of test cylinders in close proximity to and in the same manner as the pile. After 24 hours cure in conformance with ASTM C31/C31M subject to requirements for test cylinder transportation described in this Article. Safely store test cylinders at manufacturing site. Cylinder molds shall conform to ASTM C470/C470M.

d. Label test cylinders with the date, pile number, and Drawing page number of the pile being manufactured. Identify cylinders with the same numerical identification system used on Drawings for the piles. Use same identification system for samples Contractor requires for its own use. Keep records of the date of sampling, the class and mix proportions of the concrete, and Work location from which the sets of samples were taken.

e. Piles shall be considered acceptable when test cylinders tested by Test Lab achieve a minimum compressive strength of 6,500 psi at 28 days.

f. Engineer may increase the required number of test cylinders if the specified concrete strength is not being attained consistently or if, upon Engineer's approval, Contractor elects to drive piles less than 28 days after casting. Engineer may reduce the number of test cylinders upon determining that high concrete strengths are consistently produced and the concrete and curing processes are uniform.

g. If the test cylinders show compressive strengths below the minimum acceptable limit, Engineer may allow coring of the piles at Contractor's sole cost and expense. Cores shall conform to ASTM C42 and RS Subsection 201-1.1.5. Piles shall be considered acceptable only if cores tested by Test Lab attain a minimum compressive strength of 6,500 psi. Strength reduction to 85 percent of the required compressive strength shall not be accepted.

h. Schedule test cylinder deliveries to Test Lab with Engineer. Do not transport test cylinders until a minimum of 7 Calendar Days after they have been cast, but no later than 14 Calendar Days after casting. Avoid damage to test cylinders and loss of identifying labels during handling and transporting. Failure to comply with the provisions of this Section regarding cylinder handling may be cause for rejection of the pile. Prevent moisture loss during transportation by wrapping the specimens in plastic. Transportation time shall not exceed 4 hours.

E. Inspection:

1. Engineer reserves the right to inspect the manufacturing or fabrication facilities at any time during Work to ensure that the materials and workmanship are in conformance with Specifications. Inspection shall not relieve Contractor from full responsibility for the accuracy and quality of Work. Refer to Source Quality Control Article of this Section.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Exercise care to prevent impact and shock stresses in the piles while lifting or handling.

B. Piles may be removed from the casting beds for storage on-site after concrete has attained a compressive strength of 4,000 psi. Piles shall not be transported by truck, rail, or barge until 7 Calendar Days after removal from casting beds. Piles shall not be lifted into the driving leads or subjected to the force of the driving hammer until the concrete in the pile has attained a compressive strength of 6,500 psi minimum, nor sooner than 14 days after casting.

C. Equalizer bars, or equalizer slings, designed to suspend the piles at their designated pickup points shall be provided on lifting equipment. Calculate forces involved in pile handling operations using pile pickup points to limit deflection, avoid excessive bending stresses, cracking, spalling, or other injuries. Do not use chain slings around the piles. Wire rope slings, tongs or other lifting apparatus shall be so designed as to minimize jerking of the slings and abrasion of the pile in tipping or swinging.

D. Handle piles at pickup points located as shown on Drawings. If alternate pick up points are to be used, submit calculations signed by a civil or structural engineer registered in the State of California with at least 5 years pile handling experience. Pickup points shall be marked on piles so Inspectors can determine if piles are being lifted properly.

E. Pile Storage:

1. Pile storage shall be on rigid unyielding foundations to prevent cracking of the piles from differential settlement of the foundations. Survey storage area before storing piles. Store piles true and on a straight plane such that the ends of piles are not out of a straight plane by more than 1-1/2 inches and longer piles or piles at intermediate supports do not deviate from a straight plane by a proportional measure, for example, not more than 1/2 inch in 33 feet.

2. Provide and install blocking to ensure that stored or stacked members are supported at the designated pickup points plus 1 intermediate row of supports between each pickup point. Blocking members shall be of uniform size within any tier of piles.

3. Tiered members shall have their bearing points located 1 above the other.

4. Stacking of piles in tiers more than 4 high, or storage of materials or equipment upon the piles shall not be permitted.

5. Members secured for shipping shall have hold-down ropes or bands to prevent movement or damage during transportation.

F. Replace piles damaged or overstressed by handling at no additional expense to Department.

1.10 EXISTING GEOTECHNICAL CONDITIONS

A. Department requires Contractor to review geotechnical information described in SITE CONDITIONS Section. These geotechnical reports are included as part of the electronic bid package.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

A. Staylath Design:

1. Assumptions and criteria used in design shall include but not be limited to the following:

a. The staylath system may be used as support for deck formwork.

b. Deflections under wet concrete loading shall not exceed L/240 and deflections under additional loads on hardening concrete shall not exceed L/480, where L is the span between supports.

c. The systems shall be designed to support loads to be placed; however, previously placed concrete shall not be considered as support for freshly placed concrete.

d. Staylath shall be designed to accommodate piles that are a minimum of 24 inches out of alignment measured from the centerline of pile with no modifications.

1) Friction collars shall cause no permanent alterations to piles.

e. The latest edition of City of Los Angeles Building Code shall be used for allowable stress criteria.

f. Comply with the requirements of ACI PRC-347.

B. Concrete Mix Design:

1. Concrete shall have a minimum 28 day compressive strength of 6,500 pounds per square inch (psi). Concrete shall contain the number of sacks and type of Portland cement per cubic yard called for in the design submittal. Minimum cementitious material content used for performance and durability, regardless of design strength, shall be 752 pounds (8 sacks) per cubic yard of concrete. For a combined cement/fly ash content of 752 pounds per cubic yard, the weight of each shall be: cement 640 pounds and fly ash 112 pounds. Fly ash shall be Class F, conforming to RS Subsection 201-1.2.5.3. If mix design requires more cementitious material to achieve the design strength, fly ash shall be held at 15 percent of total cementitious material.

2. Water to cement materials ratio shall not exceed 0.38 including combined water in the aggregate.

3. Slump Range (ASTM C143/C143M): 3 to 4 inches. Design mix test results shall reflect the slumps to be used. If high range water reducers are used to increase slump, Contractor shall demonstrate that maximum water to cement ratio is not exceeded.

2.2 MATERIALS

A. Cement shall be Type II, low alkali Portland cement conforming to ASTM C150/C150M and RS Subsection 201-1.2.1.

B. Aggregates shall conform to ASTM C33/C33M and RS Subsection 201-1.2.2 with a combined aggregate gradation C (1 inch maximum) as shown in RS Table 201-1.3.2. Aggregates shall weigh at least 140 pounds per cubic foot based on the minimum density of solid material in an oven-dry condition.

C. Mixing, curing, and washing water shall conform to RS Subsection 201-1.2.3.

D. Fly ash shall be Class F, conforming to RS Subsection 201-1.2.5.3 and ASTM C618.

E. Admixtures: No calcium chloride, thiocyanate, or other admixtures containing more than 0.05 percent chloride ions.

1. Water reducing admixtures shall conform to ASTM C494/C494M, Type A and shall be non toxic after 30 days. Amount of admixture added to the concrete shall conform to manufacturer's written instructions.

2. The use of other admixtures is subject to approval by Engineer.

F. No component of concrete mix design shall contain calcium chloride.

G. Curing materials shall conform to RS Subsection 201-4 and to the requirements of ASTM C309 with the additional requirement that permeability not exceed 0.039 gm/cm^2/72 hours. Curing material shall be Super Aqua Cure VOX as manufactured by Euclid Chemical Co., Cleveland, Ohio, or other Engineer approved coatings. Tests for compliance shall be made by manufacturer with manufacturer’s certification furnished by Contractor to Engineer. Manufacturer’s certification shall state quantity or coverage required to meet or exceed tests, surface texture of concrete, and method of application. Submit manufacturer’s certification that the product meets ASTM C309 and the additional permeability requirement; manufacturer shall also specifically state the coverage required to meet these requirements. Curing compound shall not be used where coatings shall later be applied to the concrete surface. In this case, use continuous water curing.

H. Hi-tensile Reinforcing:

1. Small diameter prestressing strands (nominal strand diameters from 0.25 inch through 0.60 inch) shall be of the uncoated 7 wire high tensile steel cold drawn type, stress relieved after being formed into strands. The strand shall conform to ASTM A416/A416M Grade 270, low relaxation. Nominal size of strand shall be as shown on Drawings.

2. A microscopic and metallographic examination shall be made by Engineer on representative sections of the wire previously stressed to 70 percent of its ultimate strength. The appearance of a laminated structure or metallurgical defects shall be grounds for rejection.

3. Strands shall be free of dirt, rust, oil, grease, or other deleterious materials, and in place before concrete is poured.

I. Spiral Reinforcing:

1. Spiral reinforcing shall meet the requirements of ASTM A1064/A1064M unless otherwise noted on Drawings.

J. Reinforcing Steel:

1. Reinforcing steel bars shall be deformed bars and conform toASTM A615/A615M, Grade 60.

2. Steel material for reinforcing bars with upstands (dowels) shall conform to CONCRETE REINFORCING Section.

K. Corrugated metal tubes shall be minimum of 0.023 inch thick with a minimum inside diameter of 1-7/8 inch. The metal shall be mild steel.

L. Pile Buildup Materials:

1. Concrete shall conform to CONCRETE REINFORCING Section.

2. Steel material for reinforcing bars with upstands (dowels) shall conform to CONCRETE REINFORCING Section.

3. Steel spiral shall conform to ASTM A1064/A1064M.

4. Neat cement grout for dowel anchorage shall be non-shrink, non-metallic, cementitious grout and shall have a minimum 28-day compressive strength of 7,000 psi. Manufacturers: Five Star Products Inc. or BASF Corporation.

M. Staylath Material:

1. Staylath may be either timber or metal as approved by Engineer. In the event that individual timbers are less than 6 inches in thickness, Engineer may permit their use provided timbers are laminated and securely bolted together to result in staylath not less than 6 inches in thickness and 12 inches in depth.

## 2.3 MANUFACTURE AND MARKING OF PILES

A. General:

1. Manufactured piles shall be solid precast unit type, cast monolithically in a pile casting bed employing pre-loaded high-tensile steel reinforcing. Pile lengths, cross-sections, and pre-tensioning shall be in accordance with Drawings.

2. Quantity of Piles:

   a. The quantity of piles shall be as shown on Drawings.

3. Surplus Piles:

   a. Surplus piles shall be cast along with production piles in quantities and lengths determined by Engineer. In general, surplus piles may be used to replace piles broken during handling or installation, or piles driven in unacceptable locations. These piles shall be cast at the maximum length shown on Drawings as directed by Engineer.

   b. Store piles in such a manner as to avoid damage to the piles and at no additional expense to Department.

   c. At a minimum, after the second month of production pile installation, and 30 days prior to the end of the pile casting, Engineer shall review the inventory and breakage experience, and order additional or fewer surplus piles.

   d. Transport and store surplus piles remaining at the end of pile driving operations as directed by Engineer.

4. Furnish prestressed concrete piles as indicated on Drawings. Each pile shall be stamped or marked with the date of its manufacture, length, and casting number. Lifting points shall be designed and marked as indicated on the approved shop drawings.

5. Except as specified in this Section, casting tolerances shall comply with requirements of Division 6, Section 6.4 of PCI MNL-116. Section 6.4.1 which states that the "tolerances shown in Article 6.4 must be considered as guidelines for an acceptability range and not limits for rejection" shall not apply. Dimensions that exceed the prescribed tolerances described in Paragraph 2.2 B.3 of this Section shall be cause for rejection of the pile. Such piles shall not be measured for payment. When tolerances are exceeded, grinding or patching shall not be permitted.

B. Pile Manufacture:

1. Impress numbers, at least 5 inches in height, in the concrete, consecutively indicating the sequence in which piles were manufactured. Place numbers on 1 face of the pile, approximately 3 feet from the pile head. Keep records of each pile’s manufacturing date.

2. Piles shall be delivered in sequence for driving in conformance with Contractor's pile driving sequence and schedule. Pile driving sequence shall start with landside piles and progress to waterside piles.

3. Manufacture piles to the following dimensional tolerances, which shall govern over PCI MNL-116 criteria cited in Quality Assurance Article of this Section:

   a. Length shall be within plus or minus 1 inch.

   b. Deviation from a straight line shall be not more than 1/8 inch within any 10 feet of pile length. The total deviation from true centerline (straight line drawn between centers of pile ends) of pile shall not exceed 1/2 inch at any point along the length of the pile when pile is in true plumb position.

   c. Cross sections shall be within minus 1/4 inch to plus 1/2 inch.

   d. Pile head surface shall be within plus or minus 1/2 degree from a true right angle plane. Surface irregularities, within plus or minus 1/8 inch.

   e. Location of reinforcing steel shall be within the following tolerances:

      1) Reinforcement cover, minus 0 inch, plus 1/4 inch.

      2) Spacing of spiral plus or minus 1/2 inch.

   f. Location of prestressing strands shall be within plus or minus 1/4 inch from that indicated throughout whole length of pile.

g. Failure to maintain the pile dimension tolerances and the reinforcing location tolerances shall be cause for rejection of the pile.

h. Location of jet tube shall not vary more than plus or minus 1/2 inch from that indicated throughout whole length of pile.

4. Forms:

a. Forms shall be steel and shall be designed to prevent damage to piles upon removal.

b. Forms shall be set up and arranged to provide adjacent working space and access for manufacturing.

c. Forms shall permit longitudinal movement of pile without damage during transfer and release of prestressing force.

d. Forms shall be free of dents, creases, and other irregularities.

e. Forms shall be cleaned and oiled prior to each use.

f. Forms shall be designed to allow prestressing of the strands and allow access for placing and tying reinforcement and for positioning and anchoring embedded items.

g. Except for the top horizontal surface that may be hand finished, concrete surfaces of the pile shall be formed. Methods of forming that involve extruding any portion of the pile are acceptable if Work is performed by a fabricator with at least 5 years experience in this type of pile manufacturing or if Work is accomplished under the direct and continuous supervision of a superintendent with at least 5 years experience in the manufacturing of prestressed concrete piles with methods involving extrusion of any portion of the pile.

5. Placing Reinforcement:

a. The reinforcing steel shall be installed in the casting beds in the shape and dimensions shown on Drawings. Strands shall be held in position so that steel shall retain its shape after stressing and during placement of concrete.

b. Templates shall be used to accurately space reinforcing bars. Before assembling the steel, the bars shall be bent if required and the spiral hooping formed at the pitches indicated on Drawings.

c. Spiral wire reinforcing shall be tied with No. 16 annealed steel wire to prevent movement during the concrete placement with minimum ties placed as follows:

1) Tie every third spiral to the strand at the top half of the pile locations at 3 strand intersections. Contractor shall demonstrate to Engineer that method of securing spiral shall prevent longitudinal movement or bunching of spiral. On representative piles selected by Engineer, remove fresh concrete to the level of spiral so that spacing may be checked. If spiral movement is detected, take remedial measures as required by Engineer.

2) Ties shall have a full 360 degree twist and the ends shall be bent inward away from the concrete surface.

3) Minimum concrete cover over the spiral wire reinforcing shall be 3 inches unless shown otherwise on Drawings.

4) Lap splices in the spiral as shown on Drawings and wire together at 3 points.

5) Concrete spacer blocks if used, shall be same strength concrete as piles.

6. Prestress:

a. Initial prestress in strands shall not exceed 70 percent of the ultimate strength of the strands and the loss of prestress shall be taken into consideration in achieving the minimum effective prestress in the concrete section. Minimum effective prestress after losses shall be 1,000 pounds per square inch. Clear net spacing between wire strands or wire strands and mild steel reinforcing bars shall be not less than 1 1/2 inches. Prestress in the concrete section shall be as shown on Drawings.

b. Stress strands uniformly either singly or simultaneously, to the design load, before concrete is poured, by means of a hydraulic jack, or jacks, equipped with pressure gages permitting the stress to be computed at any time. Measure elongation of the strand at the completion of the tensioning operation. Elongation shall conform to elongation tables furnished by the manufacturer of the strand. If there is a difference of over 5 percent between the steel stress determined from adjusted elongation and from the gage reading, determine and correct cause of the discrepancy. When multiple strands are tensioned simultaneously, use a dynamometer approved by Engineer to ensure that the same initial stress is in each element prior to completing the full stressing operation.

7. Placing and Finishing Concrete:

   a. Deposit concrete continuously and as rapidly as practicable after each pile section pour has started and until the entire pile section pour has been completed in the casting bed.

   b. Screed and brush pile top surface to a uniform, even texture similar to that produced by the forms.

   c. Vibrating:

      1) During and after depositing concrete for piles, completely consolidate mix with internal and external vibrators. Submit proposed vibration method for Engineer’s review. Concrete shall be dense with a surface free from honeycombs or voids.

      2) Vibrator frequency shall not be less than 3,600 cycles per minute. Intensity of vibration shall be sufficient to cause the concrete to flow and settle into place, and to make the effect on the concrete visible over a radius of at least 2 feet. Vibrators shall be applied at points not over 2 feet apart and there shall be an average of not less than 20 seconds of vibration per foot of pile.

8. Transfer of Prestress:

   a. Transfer prestress only after concrete in the pile has attained compressive strength shown on Drawings. Transfer of prestress shall be accomplished by simultaneous gradual release of tension in strands using hydraulic jacks in cases where this is possible.

b. Where release by jacks is impracticable, burn each strand at exposed points between anchorages. Burn sequence shall follow a pattern calculated to equalize the forces being transferred throughout the cross-section of the member. Heat strands with a low-oxygen flame. Minimum 4 inch lengths of wire shall be uniformly heated to gradually reduce strand tensile strength and prevent shock to piles that otherwise occurs when strands are burned with a high oxygen flame at a single point.

9. Pile Curing:

a. Cure piles by 1 of the methods described in this Section or by a method approved by Engineer in writing.

b. Cure piles until 6 by 12 inch concrete test cylinders poured during the pile manufacture and cured in the same environment as the piles have attained the minimum compressive strength shown on Drawings. Thermal matching cylinder curing systems for determining the concrete strength, such as Sure Cure System, may be used only for determining the release strength.

c. Steam Curing:

1) Immediately after each pile has been cast and finished, place pile in a curing chamber, curing box, or under a tight enclosure which shall protect the pile from wind and drafts. Size chambers or enclosures to allow full circulation of steam around exposed surfaces of the pile.

2) Instrumentation:

a) Install exterior recording thermometers and interior temperature probes with enclosures and power source along with wiring. Place either 1 exterior thermometer or 1 interior probe at each pile. Install exterior thermometers and interiors probes in an alternating sequence. Parallel casting beds shall have the instrumentation placed in a staggered and alternating pattern along the piles. Install the thermometer and the probe close to the middle of the pile, not closer than 5 feet and not farther than 10 feet from the orifice where the steam is introduced. Locate the exterior thermometer at the side where the steam is introduced. Locate the interior probe more than 8 inches and less than 10 inches from the surface of the piles. Under no circumstances are the interior probes permitted to touch the jet tube. Do not commence concrete placement until temperature recording devices have been checked to the satisfaction of Engineer. Maintain uniform curing temperature throughout the entire length of the piles. Submit prints of the automatic readout daily.

b) For the purpose of checking Contractor's recording thermometer, Department may install its own recorders. In this case, Contractor shall furnish the power source and wires at locations designated by Engineer.

3) Commencing not earlier than 3 hours and not later than 5 hours after completion of concrete placement, subject the piles to the continuous action of steam. Introduce heat gradually to avoid thermal shock to the concrete. During the heating, temperature rise shall not exceed 25 to 35 degrees Fahrenheit (F) per hour. The interior temperature of the piles shall be held at a target temperature of 150 degrees F with an upward tolerance of 10 degrees F.

4) Cooling shall follow the steaming cycle. Protect piles from rapid drops in temperature, mechanical injury and other conditions likely to cause damage or loss of strength. During cooling, the temperature drop shall not exceed 30 to 35 degrees F per hour. The cool down procedures shall be as follows:

   a) Turn off steam following the steam cycle.

   b) Fold sides of tarps to the top of the form.

   c) Perform transfer breaks to confirm that required 4,000 psi compressive strength has been reached.

   d) Remove tarps completely, open top doors, and release the strands.

5) After steam curing, apply moist curing using either water or membrane curing compound until a total steam and moist curing time of 7 days is achieved.

d. Water Curing:

1) If piles are to be water cured, cover piles with 2 layers of wet burlap or curing mats after the finishing operations are completed. Keep mats wet by a system of perforated pipes, mechanical sprinklers, porous hoses, or other Engineer approved methods for the entire curing period. Before and during placing of the curing mats, keep concrete moist by a fine fog spray of water commencing after finish operations have ceased.

2) Water for curing shall be clean fresh water conforming to the requirements for mixing water.

e. Membrane Curing:

1) Membrane curing shall consist of a liquid vapor barrier producing compound applied over the piles. The membrane shall be a watertight film over the entire exposed pile surface. This film shall be maintained watertight throughout the curing period.

2) The sealing compound used for membrane curing shall conform to ASTM C309. If the membrane is damaged, repair with additional compound at no cost to Department.

10. Surface Defects and Fissures:

    a. General: Rock pockets and honeycombing are prohibited. Repair of such defects shall not be permitted. Such defects shall be cause to reject the pile.

    b. Individual small surface defects such as air bubbles, voids, and fissures shall be accepted without repair, if the voids or air bubbles are less than 1/2-inch in diameter and 3/8-inch in depth and if fissures do not penetrate more than 3/8 of an inch in depth.

    c. Surface defects between 3/8-inch and 3/4 inch in depth, and between 1/2-inch and 1-inch in diameter may be repaired.

    d. Repairs may be made only to those piles having 5 or less voids and fissures in the top 20 feet of the pile. If the top 20 feet contains more than 5 such defects, the pile shall be rejected.

11. Repair of Surface Defects:

    a. Grout and dry patching material shall consist of Type II Portland cement mortar mixed in the proportion of 1 part Portland cement to 2 parts of fine sand (passing a No. 14 to 20 mesh sieve) by volume. Use no more water than necessary for placing. Discard mortar which has been prepared for longer than 30 minutes or if stiffening should occur within this period. Do not re-temper mortar with water after it has first been prepared.

    b. Preparation:

        1) Ascertain depth and direction of fissures by probing with a 12-gage wire, followed by enlargement using a 3/8 to 1/2-inch drillbit to the depth and in the direction which was indicated by the probing. Remove bits broken off in concrete prior to dry packing.

        2) Scrub concrete surfaces to be repaired with a coarse, stiff, short, bristle brush prior to applying dry pack. Expose concealed holes by cleaning thin film of laitance or mortar.

        3) Hose brushed surfaces with a pressure nozzle to remove dirt and foreign objects.

c. Repair Methods:

1) While the concrete surface is still damp, apply patching material to indented, damp, concrete surfaces, followed by methods which shall provide a positive bond between the patching material and surfaces of the concrete.

a) Compact mortar grout into the predrilled fissures in a manner that prevents air voids and provides a bond between the concrete and the mortar at the interface. Following this step, dry pack surface voids by means approved by Engineer.

b) Keep patches moist for not less than 5 days after placement. Patches which show secondary fissures, or which are not bonded shall be rejected and shall be redone. In the event shrinkage occurs in the hardened patches, remove patches using key ways by drilling or other means, then re-patch. Failure to obtain a satisfactory patch shall be sufficient cause for rejecting the pile or piles in question.

12. Repair of Void Left by Embedded Lifting Device:

a. Patch the void left by the embedded lifting device with cement grout, provided the void has sufficient depth (greater than 3 inches) and roughness to provide a good bond and if the repair shall not suffer damage during lifting and installation. If the void does not meet this criteria, Contractor shall use an epoxy grout or a polymer modified cementitious grout to repair the void. This material and patching method shall be approved by Engineer.

b. Grout and dry patching material shall be as specified in Repair of Surface Defects Paragraph of this Article.

c. Preparation:

1) Scrub concrete surfaces to be patched with a coarse, stiff, short, bristle brush prior to applying dry packing. Remove any material from the lifting device void that would prohibit adequate bond.

a) Hose brushed surfaces with a pressure nozzle to remove dirt and foreign objects.

d. Patching Methods:

1) While the void is damp, apply dry patching material to the void, followed by methods which shall provide a positive bond between the patching material and surfaces of the concrete or lifting device.

a) Compact mortar grout into the lifting device void in a manner that prevents additional voids from forming and provides a bond between the device void and the mortar at the interface. Following this step, dry pack surface voids by means approved by Engineer.

e. Keep lifting device void patch moist for not less than 5 days after placement. The patch shall be rejected if it shows secondary fissures, or is not bonded and it shall be redone. In the event shrinkage occurs in the hardened patch, remove patch and re-patch. Contractor may repair shrinkage cracks with the use of epoxy injection materials and methods approved by Engineer. Failure to obtain a satisfactory patch shall be sufficient cause for rejecting the pile or piles in question.

## 2.4 SOURCE QUALITY CONTROL

A. Department shall provide pile-manufacturing inspection free of charge within a 75-mile radius of Department Administration Building. Contractor shall bear the costs for airfare and ground transportation, meals, and lodging for 1 Inspector for pile manufacturing site inspection beyond the specified radius. Transportation costs shall include returning Inspector to Department Administration Building at 5-day intervals. Inspection shall be considered to be full time and continuous for the period beginning 2 days prior to pile casting through 3 days following completion of casting. At Department's option, an independent testing laboratory may be assigned to provide pile-manufacturing inspection.

## PART 3 – EXECUTION

### 3.1 PILE DRIVING EQUIPMENT

A. General:

1. Driving criteria and other information derived from CONCRETE INDICATOR PILE TESTING Section regarding pile length and pile installation may be used for production piles only if Contractor uses the identical equipment that was used to install indicator piles. Equipment covered by these criteria includes, but is not limited to: barge size and type, crane size and type, lead size and arrangement, templates, driving hammers and ancillary equipment, and any other equipment used to install the piles. Equipment proposed and supplied by Contractor may be rejected by Engineer if it is not identical as that used to install indicator piles, has the appearance of being excessively worn, or is in disrepair.

    a. Contractor may propose using a different hammer than the hammer used during the indicator pile program provided the hammer meets the requirements of this Section and CONCRETE INDICATOR PILE TESTING Section. Contractor shall drive a minimum of 3 additional piles with PDA using the proposed hammer to determine a driving criteria. No additional payment shall be made for the piles or PDA. The piles shall be driven at non-production locations as selected by Engineer. No allowance shall be made for cost to Contractor and no schedule time extension shall be allowed for changes of pile driving equipment. If Contractor elects to use both a waterside pile driving rig and a landside pile driving rig, the requirements of this Paragraph apply to both pile driving rigs.

2. Provide and maintain equipment for the handling and installing of piles. Barges and other floating equipment shall be of a size to be stable without excessive movements or tilting, under average sea conditions, during which pile installation shall be carried out. Equipment failing to meet these requirements shall be taken out of service. If 2 pile driving rigs are used, landside piles shall be driven prior to waterside piles. For landside rigs, Contractor shall be responsible to establish, without additional cost or time delay to Department, that the weight of the landside rig shall not jeopardize the stability of the embankment.

3. Contractor shall make equipment available for inspection by Engineer. Deficiencies in quality, quantity or type of equipment shall be corrected prior to commencing Work. This inspection and approval shall in no way relieve Contractor's ongoing obligation to provide equipment required to perform Work.

4. Equipment shall be maintained in good condition and shall be capable of supporting continuous pile hammer operation at full rated speed. Any equipment failing to meet these requirements shall be taken out of service and removed from Project Site.

B. Pile Driving Leads:

1. Use fixed leads with a hydraulic spotter at the bottom. Leads shall be of sufficient length so the use of a follower is not necessary. Leads shall be straight and parallel and shall not deviate from a straight line by more than 1/2 inch over any 15 foot length. Leads shall be easily adjustable to permit axial driving without interruption if piles deviate from attitude shown on Drawings.

2. Leads shall hold the pile in its proper position during initial driving and shall guide the hammer from the highest point to the lowest point to which it must travel. Leads shall maintain the hammer on a line of action which is coincident with and parallel to the longitudinal axis of the pile during driving.

3. The use of either swinging, hanging, or semi-fixed leads shall not be permitted without the prior written approval of Engineer. Such approval shall be based on successful prior experience and shall be conditional pending initial success in the production driving operation.

C. Hammers:

1. Pile driving hammers shall be of sizes and types to deliver consistently effective dynamic energy for the piles to be driven to the pile tip elevations as indicated on Drawings. Both hydraulic and diesel hammers may be used. Hammers shall be able to meet the performance requirements specified in this Section and the sound requirements set forth in Environmental Compliance Plan included as Appendix "C" of Specifications. A Delmag D-80 hammer is deemed to fulfill the performance requirements for a diesel hammer. Hydraulic hammers meeting these requirements include: Menck MH 195 (141 kip-ft); Junttan HHK 12A (104 kip-ft); Junttan HHK 14A (121 kip-ft); and IHC SC-150 (110 kip-ft) with sound insulation system. These or equivalent hammers shall be allowed.

2. Contractor shall perform Wave Equation Analysis of Pile (WEAP) pile-drivability analysis to select the appropriate hammer per Article "Wave Equation Analysis of Pile Drivability". The WEAP analysis shall be performed by a Professional Engineer holding a currently valid Certificate of Registration in the State of California with a minimum of five years of experience in performing such anaylsis. The proposed shall be confirmed by the indicator pile program.

3. Provide a hammer that shall deliver the required energy to install the piles without damage. Minimum manufacturer’s rated hammer energy shall be 200 kip-feet for diesel hammers, and 100 kip-feet for hydraulic hammers. Minimum ram weights shall be 17,000 pounds for diesel hammers and 20,000 pounds for hydraulic hammers. Note: The Delmag D-80 hammer has a rated hammer energy of 225.5 kip-feet, and a ram weight of 19,500 pounds.

4. Hammer shall be capable of low energy driving or tapping (short stroke) through soft soil strata to prevent tension in the pile from exceeding the net prestress. Reduce fuel setting on diesel hammers or the energy setting on hydraulic hammers as directed by Engineer to provide low energy driving. Select a hammer that is capable of providing a reduced rated hammer energy not exceeding 127,000 foot-pounds for diesel hammers and 40,000 foot-pounds for hydraulic hammers. Hammers incapable of low energy driving shall be rejected. PDA testing during indicator pile driving shall be used to verify that net tensile stress is not generated.

5. For diesel hammers, provide measuring system so that hammer stroke is easily observed by Engineer. For hydraulic hammers, provide an instrument readout panel that records hammer stroke and energy (velocity at impact).

6. Provide hearing protection as required by Occupational Safety and Health Administration (OSHA).

7. Contractor shall bear costs and delays due to hammer equipment repair including associated retesting of hammers.

D. Hammer Capblock and Cushion:

1. Capblock material shall be made of a stable and predictable material such as aluminum or micarta, Conbest as manufactured by Penn State Fabricators or other as approved by Engineer. The helmet shall seat onto the pile and bear evenly and concentrically with minimum play upon the pile. The pile head shall be free to rotate in the helmet.

2. Helmet shall contain a cushion pad consisting of nominal 1-inch thick laminated plywood or Douglas fir material placed in the pile driving helmet. Thickness of the cushion shall be between 6 inches and 18 inches. Cushion thickness required during driving shall be thicker than during final driving. Actual thickness to be used shall be determined by Engineer during the indicator pile program.

3. Place new cushion(s) in the helmet at the start of driving of each pile. In addition, replace the cushion(s) in the helmet as soon as the cushion begins to smoke, burn, or otherwise deteriorate. Increase cushion thickness to reduce tensile or compressive stresses when requested by Engineer.

E. Pile Spud:

1. A heavy steel spud may be required to install some of the piles through several feet of armor rock. Provide a fabricated steel spud before commencing pile driving. The length of the spud shall be adequate for installation of “A” row piles (outboard piles).

## 3.2 INSTALLATION

A. General:

1. Provide facilities for Engineer to inspect and record pile data.

B. Marking of Piles:

1. Mark each pile at 1-foot intervals for the purpose of recording the penetration resistance and depth of penetration of the pile. The marks shall be clearly visible. Provide additional marks at 1/10 foot intervals for selected feet, as requested by Engineer.

C. Installation of Piles and Tolerances:

1. Piles shall be installed only in the presence of Engineer.

2. It is anticipated that pile installation through the rock buttress and slope shall result in consolidation of the rock fill and lateral movement of piles during construction. It is intended that Contractor make necessary provisions to the driving procedure, initial spotting, and initial inclination of the piles in order to achieve installation to the indicated tolerances.

   a. Contractor shall make at least 3 attempts to drive piles if piles wander more than 6 inches in the first 10 to 20 feet of driving, including driving the piles, removing piles, realigning piles, and re-driving piles 3 times. If piles are still not in correct position after 3 attempts, notify Engineer.

3. Install piles without voluntary interruption by methods approved by Engineer and to the depths shown on Drawings.

4. Cushions, Hammer Fuel Settings, or Energy Settings: Change pile cushions, or change hammer fuel or energy settings when requested by Engineer.

5. Install piles such that their final positions are as shown on Drawings. Pulling piles into position during or after driving is prohibited. Refer to Price and Payment Procedures Article of this Section for compensation where allowed. Piles which do not meet the location requirements within the stated tolerances, may be rejected by Engineer. If a pile goes out of tolerance and has been driven more than 20 feet, Engineer may direct Contractor to take the following corrective measures:

    a. Engineer may order the pile to be broken off 1 foot below the mudline and be replaced by a second pile at a nearby location.

    b. Engineer may allow the pile to remain in place.

    c. For replacement piles, Engineer shall require Contractor to provide a Work plan for corrective measures for Engineer’s review. Work plan shall include modification to equipment or driving procedure to remediate the problem. No schedule time extension shall be allowed for the piles that were deemed unacceptable by Engineer due to Contractor’s error.

6. Obstructions:

    a. Where obstructions are encountered that result in a sudden, unexpected increase in penetration resistance and deviation from the specified tolerances, perform 1 or more of the following actions at the direction of Engineer:

        1) Remove the obstruction and redrive.

        2) Perform a jet tube inspection.

        3) Extract, inspect, reposition, and redrive the pile.

    b. Drive a driving ram, spud, or mandrel of a design approved by Engineer, in advance of driving the piles where rock or other obstructions are encountered and when directed by Engineer. This shall be done to provide a clean and unobstructed opening for the piles to reach the subsoil without damage.

    c. Relocate or remove rocks or other obstruction which prevent the locating or driving of the piles except where Engineer permits spudding to break rocks.

d. If an obstruction is encountered above the required pile toe elevation, Contractor shall stop driving and immediately determine the nature and extent of the problem by any method, subject to the approval of Engineer. Engineer shall review the problem and determine the appropriate steps for resolution as specified in this Section.

e. If an obstruction which cannot be easily removed is encountered less than 15 feet below the ground surface, the object shall be spudded through. The procedure for spudding shall be as follows:

1) Remove pile and place safely on ground or barge using techniques that allow pile to be reused. Any damage which occurs to the pile during removal shall be the responsibility of Contractor. Engineer shall determine if any damage renders the pile unusable.

2) Use a spud of Contractor’s design, approved by Engineer, to break up the obstruction.

3) Pile shall then be redriven in the same location.

f. If the obstruction cannot be spudded through or occurs deeper than 15 feet below the ground surface, drive another pile at an adjacent location directed by Engineer.

7. Damage To Surroundings:

a. The care and preservation from damage, due to pile driving operations, of contiguous and nearby features, whether such features are existing or constructed as a part of Contract or concurrent with it, shall be the responsibility of Contractor.

b. Contractor shall repair, restore, replace, refit, and otherwise place in the same condition as existed prior to damage features that suffered damage during pile driving operations at Contractor's sole cost and expense.

8. Termination of Installation:

a. Contractor shall follow the pile driving criteria provided by Engineer after completion of the indicator pile program.

9. Redrive piles that are raised during the process of driving adjacent piles or loosened as a result of the use of water jets, if required by Engineer. No allowance shall be made for cost to Contractor for redriving of raised or loosened piles.

10. Where pile cracking, spalling, or exposed reinforcement is identified in the diver inspection reports, Contractor shall, within 7 Calendar Days, repair the pile with Splash Zone A-788 as manufactured by Carboline (800-848-4645). The repair method shall be submitted and approved by Engineer before proceeding with repair Work. Repair Work shall be at Contractor's sole cost and expense.

11. Surveying Pile Positions and Inclinations: Perform periodic pile survey Work during pile driving operations as described in SURVEYING AND FIELD ENGINEERING Section.

## 3.3 OBSERVATIONS AND RECORDING OF PILE BEHAVIOR

A. Observe and record the following data for each pile during both initial installation and restriking:

1. Pile number, length, depth of embedment, and mudline elevation at the start and completion of driving.

2. Type of hammer, lead arrangement, use of template, or other similar information requested by Engineer.

3. Pile cushion information including type and thickness at the start and end of driving, any change in cushioning made during pile installation, and cushion conditions (used, new, and thickness) during restrikes.

4. Driving record for each foot of installation.

5. Number of hammer blows per foot of penetration for each foot of driving including periods when driving are combined.

6. For diesel hammers, average hammer stroke over every foot of driving. For hydraulic hammers, a printed readout of the hammer stroke and net impact energy shall be provided to Engineer.

7. Resistance in blows per 1/10 of a foot for the last 12 to 36 inches of final driving as directed by Engineer.

8. Any unusual occurrence during installation, particularly running of pile during installation.

B. Provide a device that shall accurately indicate the penetration of the pile from a safe distance. Provide Engineer recorded pile driving information.

3.4 ANCHORAGE OF PILES

A. Anchor reinforcing bar dowels into drilled or preformed holes by neat cement grout.

B. Cut off top of piles to expose the spiral to be embedded in the deck concrete as shown on Drawings.

C. Dowel Holes:

1. Preformed dowel holes in production piles shall be deep enough to provide embedment for each reinforcing bar as shown on Drawings.

2. If the preformed hole is less than the required length, drill new holes at adjacent locations at least 25 percent greater than the nominal diameter of the reinforcing bar and deep enough to provide embedment for each reinforcing bar as shown on Drawings.

3.5 PILE RESTRIKING

A. Restrike piles as directed by and in the presence of Engineer. Engineer may request restriking on any pile at any time within 2 working days following receipt of the pile's installation records. Perform multiple restrikes on the same pile upon Engineer's request. Perform dynamic monitoring during restrikes as directed by Engineer and in conformance with CONCRETE INDICATOR PILE TESTING Section.

1. Equipment: Perform restrike of 24-inch concrete piles using specified equipment and in conformance with the driving criteria developed during the indicator pile program as modified during production pile driving. Restrike of a pile may entail movement of pile installation equipment from its current location to the pile restrike location. Restrike shall be performed with a warm hammer.

a. Use compressed, previously-used cushion blocks.

2. Mark piles in 1/10th of a foot increments prior to restriking.

3. Restrike shall be considered complete when Engineer accepts that the continuation of the activity is unnecessary.

B. A no cost extension of time to complete restrike Work, equal to the total time required to actually conduct the equipment move and restrike the piles, may be granted. Extensions of time shall not be granted if, in the opinion of Engineer, the restrike is required due to a deficient pile driving operation.

3.6 PILE CUT OFF

A. Cut off pile heads horizontally for the entire pile section where piles have been driven to above cut off elevation.

B. Trim piles to cut off elevation by sawcutting horizontally at the required cut off elevation to a depth of not more than 1 inch then chipping down the remainder of the pile head flush with the sawcut. Cut surface shall be true to horizontal cut off plane(s) shown on Drawings.

C. Expose spiral for incorporation into deck pour in accordance with Drawings.

D. Remove pile cut off from Department property. Do not drop pile cut off into harbor waters.

3.7 PILE BUILDUP

A. In the majority of cases, the design intent is that extensions be constructed on piles which are installed below cut off elevation. However, since the reinforced concrete extension‘s load-carrying capacity is not equivalent to the pile itself, extensions shall not be allowed adjacent to one another. Except 1 of the adjacent piles below cut off elevation in these locations shall be rejected.

B. Concrete piles which have been driven or cut off less than 6 inches below the proper cut off elevation shall be built up monolithically with the concrete structure above the pile by Contractor without extra compensation.

C. Concrete piles driven more than 6 inches but less than 4 feet below the proper cut off elevation indicated on Drawings, shall be built up to the planned cut off elevation. Required pile buildup shall be placed independently of the concrete deck structure.

D. Piles driven more than 4 feet below proper cut off elevation shall be built up only with Engineer’s approval. Submit details of the proposed buildup to Engineer. Piles not so approved shall be rejected and shall be broken off 1 foot below the mudline.

E. Piles driven more than 7 feet below proper cut off elevation shall be rejected. Rejected piles shall be broken off 1 foot below the mudline.

F. Pile buildups shall be constructed as shown on Drawings, or as otherwise directed by Engineer.

G. Insert reinforcement dowels into grout tubes. Dowels shall extend beyond the buildup sections without requiring rebar splices.

3.8 PLACING STAYLATH

A. Immediately prior to placing staylath, perform surveys of the pile head location and elevation in conformance with SURVEYING AND FIELD ENGINEERING Section. This information shall be compared to theoretical pile location.

B. After the piles are driven, install a network of structural members (staylath) to tie together piles and provide lateral stability of the pile network during later construction. Staylath shall maintain pile alignment and prevent shifting of the pile prior to and during deck construction until the piles are tied into the complete construction. Secure staylath in place by land anchorage as may be necessary to prevent lateral displacement of the system during construction.

C. Attach staylath to the piles with friction clamps which shall cause no permanent alterations to the pile. Drilling of holes in the pile or cutting the pile for the attachment of staylath is prohibited.

D. The use of staylath or any other method to pull piles into position shall not be permitted. Engineer reserves the right to require the gradual total release of the staylath anchorage of any pile to verify that detrimental bending stresses are not being caused by the staylath. If the pile movement occurring upon this release exceeds the amounts allowed, no additional payment for Work directly associated with the releasing and reinstalling the staylath shall be made. If the movement is so large that in Engineer’s opinion the integrity of the pile may be jeopardized, the pile shall be inspected by a diver at Contractor’s sole cost and expense. If the movement is equal to or less than the amount allowed, additional payment shall be allowed for Work directly associated with releasing and reinstalling the staylath for the pile in question. Such payment shall be made as extra Work in conformance with GENERAL CONDITIONS Section.

E. In cases where piles have been driven, cracked, spalled, or cut off below the proposed elevation of the top of the staylath as designated by Engineer, temporarily attach similar staylath below the lowest point of damage to the pile, and sufficiently low to attach to adjacent piles driven to low elevations. Such timbers shall be replaced by staylath located as specified above after the pile has been trimmed and built up to the cut off elevation.

F. Replace or realign staylath members that have been damaged or dislodged during the time the staylath system is in use.

G. The staylath system shall remain the property of Contractor after the purpose for which it was installed has been served. Dismantle and remove from Department property staylath system after concrete Work is completed.

3.9 PILE BREAK OFF

A. Break off 1 foot below mudline piles that are:

1. Cracked, bent, ruptured, or broken because of material defects.

2. Damaged by improper handling or driving, so as to impair them for their intended uses as judged by Engineer.

3. Out-of-tolerance piles not allowed by Engineer to remain in place.

B. Drive replacement piles adjacent to damaged or out-of-tolerance rejected piles as directed by Engineer.

C. Provide, after breaking off, a record survey on the location of the pile center at the mudline. Additional compensation shall not be made for multiple unsuccessful attempts to break off the pile. Except as provided in this Section for payment for Work caused by obstructions that, in Engineer’s opinion, Contractor would not have reasonably anticipated, the cost of extracting or breaking off piles shall be at Contractor’s sole cost and expense.

D. Refer to SELECTIVE SITE DEMOLITION Section or STRUCTURE DEMOLITION Section for extraction, break-off, and removal of existing piles.

3.10 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Department shall provide 1 inspection of the submerged portion of recently installed piles to check for the following problems:

a. Cracks, exposed reinforcement, spalls, and other damage.

b. Elevation and removal of steel at the top of remnant pile segments after pile removals.

2. Contractor shall cooperate in every manner to ensure diver safety.

3. Costs of additional inspections, required after pile repair or after driving replacements for rejected piles, shall be at sole cost and expense of Contractor.

PILE HAMMER DATA SHEET

| | |
|---|---|
| DIESEL HAMMER | Manufacturer _____ Model _____<br>Type: _____ Serial No. _____<br>Rated Hammer Energy _____ at _____Length of Stroke<br>Explosive Force _____ |
| HYDRAULIC HAMMER | Manufacturer _____ Model _____<br>Type: _____ Serial No. _____<br>Rated Hammer Energy _____ at _____Length of Stroke |
| VALVES | Location of Valves with Respect to Top of Cap Block in Inches<br>Intake _____<br>Cut-off _____ |
| RAM | Ram Weight _____Ram Length _____<br>Ram Cross Sectional Area: _____(For diesel hammer) |
| ANVIL | (With diesel hammers) Anvil Weight _____ |
| CAPBLOCK | Material _____ Area _____<br>Thickness_____<br>Modulus of Elasticity-E _____ (P.S.I.)<br>Coefficient of Restitution – e _____ |
| PILE CAP | Helmet<br>Bonnet Weight _____<br>Anvil Block<br>Drivehead |
| CUSHION | Cushion Material _____ Area _____<br>Thickness _____<br>Modulus of Elasticity-E _____ (P.S.I.)<br>Coefficient of Restitution - e _____ |

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concrete indicator piles and "lost" piles at locations shown on Drawings as modified by Engineer (Refer to Location of Indicator Piles Article in this Section). Indicator piles shall be cut-off and "lost" piles shall be broken off and removed as directed by Engineer. Indicator piles shall be dynamically monitored by Contractor with Case-Goble Pile-Driving Analyzer (PDA) during driving and restriking. Contractor shall also provide PDA monitoring and Case Pile Wave Analysis Program (CAPWAP) analysis.

B. The nature of Work requires flexibility in the selection of indicator pile locations and actual testing requirements. Preliminary locations for the indicator piles are shown on Drawings. The general details and testing requirements are shown on Drawings and specified in this Section. This Section describes a tentative indicator pile program since Engineer may modify locations shown on Drawings, as well as the specific testing requirements before the indicator pile testing program starts, or as it progresses. Cooperate with Engineer in performing required testing at locations indicated on Drawings and as selected by Engineer. Time is of the essence and the program may be modified at Contractor’s request to assist in meeting the schedule, as long as the primary purpose of the program, described in Paragraph C of Article is met.

1. Contractor shall establish timing of the indicator pile installation and testing. Timing of the production piles casting shall be based on Contractor’s requirements for expedient installation of production piles.

C. The primary purposes of the testing are to evaluate the performance of Contractor's proposed installation equipment and methods, determine required installation procedures, determine production pile order lengths, and establish tentative production pile driving criteria. The specific objectives of the testing are:

1. Evaluate stresses in the pile during installation relative to cushion material, cushion thickness, and hammer fuel or energy settings.

2. Evaluate:

a. Effects of impact driving procedures on rate of installation

b. Horizontal driving accuracy

c. Feasibility of reaching design tip elevations at required ultimate pile capacity.

3. Evaluate the ability of the hammer to transfer energy within the specified minimum and maximum values while not exceeding the specified maximum impact stress.

4. Evaluate the effectiveness of Contractor's pile driving equipment and adequacy of procedures to control pile position and alignment during pile installation without damaging the piles.

5. Develop data to aid in determining production pile toe elevations and manufacturing (order) lengths. Include the elevation of the top of the bearing stratum in this data.

6. Establish installation procedures and criteria including requirements for pile cushioning, changing cushions, hammer fuel or energy settings, and termination blow count criteria.

7. Establish design blow count and refusal criteria and assist in the determination of the ultimate capacity of piles that encounter premature refusal.

1.2 RELATED SECTIONS

A. Section 31 62 13.23 - Prestressed Concrete Piles

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. General:

a. Indicator piles judged by Engineer as adequate to serve as production piles shall be paid for under appropriate bid items for indicator piles, but shall not be paid for again under either furnish or install production pile bid items, nor any other bid item.

b. Some Work shall be considered incidental to Work of this Section. Cost of such incidental Work shall be included in the bid and no additional compensation shall allowed. Incidental Work shall include, but is not necessarily limited to:

1) Conferring between Engineer and Contractor.

2) Work necessary for measurement of indicator pile location and inclination.

3) Providing specified data to Engineer.

4) Mobilization and demobilization of pile-driving equipment for or during the indicator pile programs.

5) Cutting off and disposing of indicator piles in lengths under 6 feet.

6) Delays caused by malfunctioning dynamic monitoring equipment (non-compensable time extension only allowed).

c. Contractor shall pay for standby charges for the dynamic monitoring equipment and operating personnel caused by Contractor's delays in pile driving and related equipment problems.

2. Indicator Pile Testing: Furnish 24 Inch Octagonal Concrete Indicator Piles:

a. Quantities shall be based on the actual length of piles furnished upon Engineer’s approval of in-place installation. Payment shall be based on the unit price per linear foot of piling stated in Bid Proposal Line Items.

b. Items whose costs shall be considered incidental to the cost of furnishing the piles include, but are not limited to:

1) Pile cushions.

2) Other incidental items elsewhere specified.

c. Payment shall include costs to manufacture, store, transport, and handle 24-inch octagonal concrete indicator piles.

d. Payment shall include City of Los Angeles Department of Public Works, Bureau of Street Services Overload permits, inspections, pilot vehicles, and other costs associated with transporting piles to Project Site.

3. Indicator Pile Testing: Install 24 Inch Octagonal Concrete Indicator Piles:

    a. Quantity shall consist of total number of indicator piles successfully installed with dynamic monitoring equipment attached and tested by Engineer plus CAPWAP analysis. This quantity shall include 1 restrike per pile. Payment shall be based on the unit price stated in Bid Proposal Line Items.

    b. Items whose costs shall be considered incidental to the costs for installing indicator piles include, but are not limited to:

        1) Marking piles.

        2) Lifting off hammer and helmet assembly during driving to observe deviations.

        3) Varying cushion material and thickness.

        4) Varying hammer fuel settings.

        5) Using alternative pile hammers if written permission is obtained from Engineer.

        6) Measuring pile locations on completion of driving.

    c. Payment shall include full compensation for installing indicator piles with dynamic monitoring.

4. Indicator Pile Testing: Restriking 24 Inch Octagonal Concrete Indicator Piles:

    a. Quantities shall be based on the total number of indicator piles restruck with required dynamic monitoring plus CAPWAP analysis.

    b. Items whose costs shall be considered incidental to the costs for re-striking indicator piles include, but are not limited to:

        1) Moving pile-driving rig to indicator piles selected for restriking.

        2) Providing correct alignment of pile hammer and pile.

        3) Measuring location of pile and completion of restrike.

        4) Performing at least 1 CAPWAP analysis on each indicator pile restrike.

c. Payment shall be based on the unit price for each pile restrike stated in Bid Proposal Line Items. Payment shall include full compensation for Work required for restriking piles.

5. Miscellaneous Contingency Work:

a. Refer to PRESTRESSED CONCRETE PILES Section for measurement and payment for spudding obstructions, pile build-ups, pile cut-offs longer than 6 feet, and removal of installed piles.

1.4 REFERENCES

A. PCI MNL-116 - Manual for Quality Control for Plants and Production of Structural Precast Concrete Products.

B. Reference Specifications (RS):

Subsection 200-1 Rock Products

Subsection 201-1 - Portland Cement Concrete

Subsection 201-2 - Reinforcement for Concrete

Subsection 201-3 - Expansion Joint Filler and Joint Sealants

Subsection 201-4 - Concrete Curing Materials

Subsection 302-6.4 - Finishing

Subsection 303-1 - Concrete Structures

1.5 DEFINITIONS

A. General: Definitions in PRESTRESSED CONCRETE PILES Section also apply to this Section.

B. Definitions:

1. Indicator Piles: A small number of test piles driven in production pile locations and other locations prior to production driving to determine specific production pile installation requirements (driving criteria), driving behavior, hammer and equipment performance, pile stresses, order lengths for production piles, or other information.

2. Dynamic Monitoring: Monitoring performed with a pile driving analyzer (PDA) that includes gages attached approximately 4 feet from the pile head during the installation and driving. The gages shall be connected via a cable to a monitoring station on the ground at a specified distance away from the pile. PDA shall be located in the monitoring station. The gages connected to the pile consist of 2 accelerometers and 2 strain transducers. Dynamic monitoring is required during the initial installation and re-striking of indicator piles.

3. Case Pile Wave Analysis Program (CAPWAP): A computer program used to analyze data obtained during dynamic monitoring. The program estimates the distribution of resistance along the embedded length of pile.

4. Impact Stress: The stress transferred to the pile head at impact from the driving train, as determined from measurements using PDA.

5. "Lost" Pile: An indicator pile driven to maximum capacity with PDA and CAPWAP attachments in locations other than production pile locations. Engineer may allow "lost" piles to remain in place, or to be broken off and removed as directed by Engineer. "Lost" piles may be restruck.

1.6 SUBMITTALS

A. Submittals Prior To Indicator Pile Driving: Make submittals at least 30 Calendar Days prior to the scheduled start of driving unless otherwise specified. Certificates of calibration shall be traceable to National Bureau of Standards (NBS). Submit the following:

1. Qualification statement of PDA testing firm, operator, office personnel, and equipment to be used in pile testing. Qualification statement shall include:

a. Firm name and list of qualifying job experience.

b. List of names of individuals to be used in specific roles (i.e., operator, office analysis (including CAPWAP), senior reviewers, project manager). Also include specific related qualifying Project experience.

c. List type of PDA equipment to be used including the most recent transducer calibration dates.

2. Shop drawings for manufacturing, handling, and installing in conformance with PRESTRESSED CONCRETE PILES Section.

3. Quality control submittals in conformance with PRESTRESSED CONCRETE PILES Section with the exception of the production pile driving schedule and sequence.

4. Complete Pile Hammer Data Sheet at the end of this Section for proposed hammer. For hammers with variable Rated Hammer Energy Output, also supply manufacturer's operating data and Rated Hammer Energy at each fuel or energy setting.

5. Methods proposed to measure pile position and inclination after installation is complete and the piles are free from any restraint from driving template and/or the hammer and driving train leads. Refer also to SURVEY AND FIELD ENGINEERING Section for additional requirements.

B. Submittals During Indicator Pile Driving: Submittals shall be made on a daily basis.

1. Required observations during installation of each indicator pile.

2. Required pile location survey information after completion of each indicator pile installation.

a. Submit required information including the planned location (position at production pile cutoff elevation and pile inclination), "as-installed" location, and calculations indicating deviation from planned location including direction of pile inclination. Include a statement indicating if the pile was installed within specified tolerances, the degree the pile is out of tolerance, and how the installation procedures should be modified to correct out of tolerance installation.

b. Refer also to SURVEY AND FIELD ENGINEERING and PRESTRESSED CONCRETE PILES Sections for additional submittal requirements.

C. Submittals made after driving:

1. Submit the results of surveys in a formal report, to Engineer within 10 Calendar Days after pile driving.

1.7 QUALITY ASSURANCE

A. Quality assurance procedures shall conform to PCI MNL-116.

B. Piling Driving Contractor Qualifications: Competent pile driving contractor specializing in placement of marine concrete piles.

1. Pile Driving Superintendent’s Experience: 5 years of experience driving concrete piles in a marine environment.

C. A pre-indicator pile testing meeting is required. The purpose of the meeting is to discuss Contractor's intended procedures, including equipment and methods; Engineer's requirements; the general sequence and overall approach; and to address any concerns that either Engineer or Contractor may have. The meeting shall occur at Engineer's office approximately 15 days after Contractor has issued the required pile driving methods and equipment submittals. This meeting shall be held at least 15 days prior to initiation of the indicator pile driving.

D. Tests shall be performed as specified in PRESTRESSED CONCRETE PILES Section.

E. Inspection shall be performed as specified in PRESTRESSED CONCRETE PILES Section.

1.8 EXISTING GEOTECHNICAL CONDITIONS

A. Contractor shall review geotechnical information described in SITE CONDITIONS Section. Dynamic monitoring equipment settings shall conform to the recommendations in the geotechnical report.

1.9 SEQUENCE OF CONSTRUCTION

A. The following is a brief required sequence of operations related to the indicator piles testing:

1. Pre-indicator pile testing meeting.

2. Concrete indicator pile driving and analysis:

a. Install indicator piles in the sequence directed by Engineer.

b. Engineer shall review the test-driving data, determine production piles lengths, and establish production pile driving criteria.

1) Engineer reserves the right to modify pile order lengths based on observations made during production driving.

c. Engineer shall establish production pile installation criteria within 14 Calendar Days after indicator pile testing has been completed and results have been received by Engineer.

d. Contractor shall include a 10 working day minimum duration activity in the progress schedule for indicator pile data analysis preceding production pile manufacture.

e. Restrike indicator piles prior to production pile driving. Restrike data shall be used to verify pile capacity.

PART 2 – PRODUCTS

2.1 INDICATOR PILES

A. Indicator piles shall be prototype production piles, manufactured as specified in PRESTRESSED CONCRETE PILES Section. Indicator piles shall be manufactured to lengths called out on Drawings.

B. Indicator piles shall be manufactured with a Contractor-designed jet nozzle. The nozzle design shall be the same as that used for production piles. Indicator piles shall have jet tubes (center tubes) extending to the pile head.

2.2 PILE DRIVING

A. Drive indicator piles with the same equipment and methods used for production piles. Refer to PRESTRESSED CONCRETE PILES Section for requirements. The same equipment shall include, but not be limited to, barge size and type, crane size and type, lead size and arrangement, templates, driving hammers and ancillary equipment, and any other equipment used to install the piles. Engineer may reject equipment that fails to conform to approved equipment submittal, including equipment that appears to be excessively worn or in disrepair.

B. The number of indicator piles shown on Drawings shall be sufficient to test 1 equipment configuration. If Contractor elects to use more than 1 equipment configuration, 4 additional indicator piles shall be driven for each additional configuration as directed by Engineer. PDA and CAPWAP analysis shall be included with additional configurations at no additional cost to Department. Refer to Location of Indicator Piles Article of this Section for more information.

C. Contractor shall bear costs and time delays due to hammer equipment repair and associated re-testing of hammers.

D. Pile driving equipment shall conform to the requirements of PRESTRESSED CONCRETE PILES Section.

E. Provide a threaded cap to seal the jet tube in accordance with Drawings. Cap shall be capable of withstanding the jet pressures without leaking. Cap shall be designed for easy removal to allow inspection and probing down the jet tube at the request of Engineer.

2.3 DYNAMIC MONITORING EQUIPMENT

A. Dynamic monitoring equipment shall be provided by PDA testing firm hired by Contractor.

B. Provide equipment and labor required to perform Work.

C. PDA equipment shall, in general, consist of the following:

1. A pile driving analyzer (PDA) Model GCX, GCPC, or PAK.

2. A 7 channel tape recorder (with Model GCX analyzers).

3. An oscilloscope for observing wave traces (with Model GCX analyzers).

4. Transducers (accelerometers and strain gages) and cables.

5. Other miscellaneous electronic equipment and tools. (Junction box, and the like)

D. Dynamic monitoring support equipment provided by Contractor shall include:

1. A 9-foot by 9-foot (or equal) portable shelter to protect PDA equipment from the rain and wind located at least 50 feet but not more than 100 feet from each indicator pile being driven. Provide sufficient illumination in the shelter to study small specimens and review fine print in reports. Orient the shelter so that the pile driving operations are clearly visible to PDA operator. Move the shelter as required or requested by Engineer.

2. A power source to the shelter in conformance with the following requirements: 100 to 120 volt AC RMS, with a line frequency of 45 to 65 Hz. Direct current welders or other non-constant power sources are not acceptable.

2.4 PILE CUSHIONS

A. Provide cushions of the type, thickness, and quantities requested by Engineer and as necessary to perform Work. Provide plywood and Douglas fir block cushions. The maximum expected thickness of uncompressed cushion is 18 inches. The minimum anticipated uncompressed thickness is 6 inches. The cushion thickness required during jetting and driving shall be thicker than during final driving.

2.5 MANUFACTURE, MARKING, AND HANDLING OF INDICATOR PILES

A. As specified in PRESTRESSED CONCRETE PILES Section.

PART 3 - EXECUTION

3.1 LOCATION OF INDICATOR PILES

A. Indicator piles shall be driven at designated locations as shown on Drawings or selected by Engineer. Drive piles to the specified local tolerance requirements.

1. Undamaged indicator piles, as determined by Engineer, that are driven within production pile tolerance limits at production pile locations shall remain in place for use as permanent piles.

2. Engineer reserves the right to modify the indicator pile locations and sequence of driving while indicator pile testing is underway without additional cost to Department.

3.2 PREPARING PILE FOR DYNAMIC MONITORING

A. Prior to lifting the pile, prepare the pile for PDA gage attachments as follows:

1. Drill holes (approximately 7 holes with 1/2 inch diameter by 1 inch deep) at locations directed by Engineer. Use carbide masonry bits. Engineer shall provide exact number of holes, diameter, and depth requirements after Award.

2. Install masonry wedge anchors into the drilled holes.

3. Check for proper gage fit of the gages.

B. With gages and cables removed, pick and spot the pile conforming to procedures described in PRESTRESSED CONCRETE PILES Section. Align and position the pile for installation. Strike pile by dry firing the hammer a limited number of blows with fuel pump off until the pile takes an initial set and it is safe for personnel to ascend to the head of the pile and attach PDA gages. Make the gage attachments and wave speed determination as follows:

1. Demonstrate proper gage and cable attachment on the first pile installed. With the gages and cable attached to the pile, cable shall hang freely down along the pile and to the monitoring station. A competent member of the pile driving crew shall ascend to the pile head to attach gages and cables

2. Provide access to the top of the pile in a cage that allows safe working conditions. The hammer leads shall not be used to access the pile head.

3. Once the gages are attached, strike the pile with a hand held hammer as directed by Engineer until the initial wave speed of the pile has been determined and PDA settings are properly adjusted.

3.3 INSTALLING INDICATOR PILES

A. General: Install indicator piles in the presence of Engineer and in conformance with the requirements of PRESTRESSED CONCRETE PILES Section. Refer to Installation Article of PRESTRESSED CONCRETE PILES Section, concerning the following procedures:

1. Marking of piles to record depth of penetration.

2. Protection against damage to surrounding improvements.

3. Installation methods.

4. Driving accuracy and tolerances.

5. Handling obstructions.

6. Correction of material and workmanship problems, and unexpected field conditions.

B. Initiation of Driving: Begin pile driving by striking the pile for a sequence of 5 to 10 blows. Temporarily stop driving so Engineer can check PDA settings. Engineer reserves the right to repeat the sequence of 5 to 10 blows until Engineer is satisfied that PDA settings are properly adjusted, the gages are properly attached, and the equipment is working properly.

C. Dynamic Monitoring During Pile Installation: Once PDA settings are properly adjusted, commence indicator pile installation. Before the level of the gages is within 1 foot of the water surface, driving shall be halted to remove gages from the pile and re-attach gages at a higher location. Gages shall not be driven below water. A new cushion block shall be used for each pile. Installation shall conform to PRESTRESSED CONCRETE PILES Section requirements except that Engineer may frequently stop driving to request changes in the hammer fuel setting, or to check PDA gages and equipment. Upon Engineer's request, a qualified member of pile driving crew shall check gage and cable attachments, change gages, or perform similar Work.

D. Cushions And Hammer Fuel Settings: Combinations of hammer cushions and thicknesses, jet pressures, and hammer fuel settings shall be investigated during testing. Implement each combination selected by Engineer for each indicator pile installation. Change pile cushions, or change hammer fuel settings when requested by Engineer.

E. Termination of Installation: Engineer shall determine when installation and driving shall be terminated, based on data submitted by Contractor, analyzed by Engineer, and observations during indicator pile driving.

F. Pile Restriking: Perform restriking as defined in PRESTRESSED CONCRETE PILES Section. Each in dicator shall be reshtruck after a minimum of 24 hours after initial installation in conformance with Price and Payment Procedures Article of this Section. Additional Restriking may be requested at any time during the indicator pile testing program. If requested, perform multiple restrikes on the same pile. Dynamic monitoring is required during restrikes. Restrikes shall be performed with a warm hammer. Use compressed, previously-used, cushion blocks for restriking piles. Mark piles in 1/10 of a foot increments prior to restriking.

G. Position and Inclination Survey:

1. Within 24 hours after completing the installation of each indicator pile and after the pile has been released from restraints including templates, helmets, and the hammer leads, survey the position and inclination of the pile in conformance with SURVEY AND FIELD ENGINEERING Section.

2. Calculate deviations from the planned position and inclination, and compare the deviations with the driving tolerances specified in PRESTRESSED CONCRETE PILES Section.

H. Replace indicator piles accepted by Engineer as production piles where they are damaged or lost before being incorporated into the deck.

3.4 OBSERVATIONS AND RECORDS OF PILE BEHAVIOR

A. Observe and record pile behavior by observing and recording the following for each indicator pile during both initial installation and restriking:

1. Indicator pile number, length, depth of embedment and mudline elevation at the start and completion of driving.

2. Type of hammer, lead arrangement, use of template, or other similar information requested by Engineer.

3. Pile cushion information including type and thickness at the start and end of driving, any change in cushioning made during pile installation, and cushion conditions (used, new, and thickness) during restrikes.

4. Driving record for each foot of installation.

5. Number of hammer blows per foot of penetration for each foot of driving including periods when driving.

6. Average hammer stroke over every foot of driving. For open-ended diesel hammers, record with a saximeter capable of averaging and storing data over each foot of driving. The saximeter shall be provided by Contractor and shall conform to PRESTRESSED CONCRETE PILES Section. For hydraulic hammers, provide a printed readout of the hammer stroke and net impact energy shall be provided to Engineer.

7. Resistance in blows per 1/10 of a foot for the last 12 to 36 inches of final driving.

8. Any unusual occurrence during installation, particularly running of pile during installation.

B. Provide a device that shall accurately indicate the penetration of the pile from a safe distance. Provide Engineer with pile driving information recorded.

C. Refer to SURVEY AND FIELD ENGINEERING Section for information on bench marks and baselines and requirements for survey after each day’s driving.

D. At the end of the indicator pile program, indicate preferred sequence and method for installing production piles to achieve pile design capacity. Engineer shall consider Contractor's recommendations after determining required production pile tip elevations and driving criteria.

3.5 INDICATOR PILE CUTOFF

A. Cut off indicator piles approved by Engineer for use as production piles in conformance with PRESTRESSED CONCRETE PILES Section.

B. Piles that Engineer determines to be inadequate for incorporation as production piles shall be broken off and removed in conformance with Indicator Pile Locations Article of this Section.

C. Cut off piles at the top as shown on Drawings. Expose 1-1/2 turns of the spiral for incorporation into the deck pour in conformance with Drawings.

D. Cut off pile heads horizontally for the entire pile section where piles have been driven to above cutoff elevation.

E. Trim piles to cut-off elevation by sawcutting horizontally at the required cutoff elevation to a depth of not more than 1 inch then chipping down the remainder of the pile head flush with the sawcut. Cut surface shall be true to horizontal cutoff plane(s) shown on Drawings.

F. Remove pile cutoff from Department property. Do not drop pile cut off into harbor waters.

G. Indicator Piles at Production Pile Locations:

1. Preformed dowel holes in indicator piles shall be deep enough to provide embedment for each reinforcing bar as shown on Drawings.

3.6 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Department shall provide 1 diving inspection of the submerged portion of recently installed piles to inspect the piles for cracks, exposed reinforcement, spalls, and other damage. Refer to PRESTRESSED CONCRETE PILES Section for pile repair requirements.

2. Costs of additional inspections required after pile repair or after driving replacements for rejected piles, shall be at sole cost and expense of Contractor.

PILE HAMMER DATA SHEET

| | |
|---|---|
| DIESEL HAMMER | Manufacturer _____ Model _____<br>Type: _____ Serial No. _____<br>Rated Hammer Energy _____ at _____Length of Stroke<br>Explosive Force _____ |
| HYDRAULIC HAMMER | Manufacturer _____ Model _____<br>Type: _____ Serial No. _____<br>Rated Hammer Energy _____ at _____Length of Stroke |
| VALVES | Location of Valves with Respect to<br>Top of Cap Block in Inches<br>Intake _____<br>Cut-off _____ |
| RAM | Ram Weight _____Ram Length _____<br>Ram Cross Sectional Area: _____(For diesel hammer) |
| ANVIL | (With diesel hammers) Anvil Weight _____ |
| CAPBLOCK | Material _____ Area _____<br>Thickness_____<br>Modulus of Elasticity-E _____ (P.S.I.)<br>Coefficient of Restitution – e _____ |
| PILE CAP | Helmet<br>Bonnet Weight _____<br>Anvil Block<br>Drivehead |
| CUSHION | Cushion Material _____ Area _____<br>Thickness _____<br>Modulus of Elasticity-E _____ (P.S.I.)<br>Coefficient of Restitution - e _____ |

END OF SECTION

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Continuous maintenance of landscape items during specified period including but not limited to:

1. Plant material

2. Irrigation system

3. Hardscape

4. Site furnishings

B. After landscape planting and irrigation Work have been completed, reviewed and accepted by Engineer, furnish transportation materials, labor, services, and equipment necessary to provide landscape and Project Site maintenance as indicated on Drawings and as specified in this Section.

1.2 RELATED SECTIONS

A. Section 32 90 01 - Planting and Landscaping

B. Section 32 93 53 - Palm Trees

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Work of this Section shall be paid under the Plant Establishment, Landscape Maintenance, and Site Care bid item of Bid Proposal Line Items for each 8 hour shift-day worked, as described in Quality Assurance Article of this Section, Paragraph B, 3.

2. On or about the first of each month of the period, Contractor shall provide Engineer with a summary invoice for labor, equipment, and incidental costs required to perform site care Work for the previous month. Contractor shall provide 24 hour prior notice to Engineer before performing site care Work. Markups are allowable; however, the combined markup for Contractor and subcontractors shall not exceed 10 percent of the cost of Work. Any remaining allowance funds shall be credited back to Department at the end of site care period.

1.4 REFERENCES

A. “Arboriculture: Care of Trees, Shrubs and Vines in the Landscape” by Richard W. Harris, Prentice-Hall, Inc., 1983.

B. University of California Cooperative Extension Publications:

1. Leaflet #2958, September, 1979: “Fertilizing Woody Plants”

2. Leaflet #2574, January, 1979: “Pruning Landscape Trees”

3. Publication #AXT-311: “Staking Landscape Trees”

1.5 SUBMITTALS

A. Product Data:

1. Submit a written list of materials that are to be used during Plant Establishment, Maintenance, and Site Care period that are not specified in PLANTING AND LANDSCAPING Section.

2. Chemicals and application procedures for insect, disease, and weed control including Safety Data Sheets (SDS).

B. Schedule of maintenance operations and monthly status report including list of equipment, materials proposed for Project, and watering schedule.

C. Documentation:

1. Licenses, permits, and insurance certificates required by Department, the State of California, or federal agency pertaining to maintenance Work.

2. Monthly record of herbicides, insecticides, and disease control chemicals used on Project.

3. Project Record Drawing documentation of existing planting and irrigation system.

4. Written recommendation by a licensed agricultural pest control advisor for weed, pest, and disease controls.

D. Closeout: Submit a maintenance manual in 3-ring binder format. Manual shall contain an indexed collection of schedules, records, and permits specified, and documentation of accepted condition of planting and irrigation at Final Acceptance.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Experience: Contractor shall have a full-time employee assigned to Project as foreperson for the duration of Contract. Foreperson shall have a minimum of 4 years of experience in landscape maintenance supervisions, with experience or training in turf management, entomology, pest control, soils, fertilizers, and plant identification.

2. Labor Force: The landscape maintenance labor force shall be thoroughly familiar with, and trained in, Work to be accomplished and shall perform the task in a competent, efficient manner acceptable to Engineer.

B. Work Force:

1. Supervision: The person shall directly supervise Work force continually and shall be on-site during the maintenance procedures. Notify Engineer if there is any change in supervisory personnel.

2. Identification: Provide proper identification continually for landscape maintenance contractor's vehicles and labor force. Employees shall be uniformly dressed in a manner satisfactory to Department.

3. Work force shall be present at Project Site at the direction of Engineer to perform specified maintenance in conformance with the approved maintenance schedule. Minimum Work force shall be a 3-person crew consisting of 1 supervisor and 2 helpers, at the direction of Engineer, working 8 hour shifts each day.

4. Perform Project Site observations for the 90 Calendar-Day Plant Establishment, Maintenance, and Site Care Period and observe completion of Work in this Section through Final Acceptance.

1.7 PLANT ESTABLISHMENT, MAINTENANCE, AND SITE CARE PERIOD

A. Plant Establishment, Maintenance, and Site Care Period Duration: 90 Calendar Days from Engineer's Notice to Proceed for Plant Establishment, Maintenance, and Site Care Period.

B. Plant and irrigation deficiencies shall be corrected before Plant Establishment, Measurement, and Site Care Period shall begin.

C. Notify Engineer 30 days after start of Plant Establishment, Maintenance, and Site Care Period for a progress maintenance observation. Items determined to be deficient during the previous observation shall be completed prior to the meeting. Failure to do so may result in an extension of Plant Establishment, Maintenance, and Site Care Period. In addition, prior to first progress maintenance observation, furnish Engineer with the following information:

1. An “as-built” planting plan of plantings installed, as specified.

2. Supplier invoices for the nursery stock, commercial fertilizers, soil amendments, mulches and herbicides as shown and specified and as installed.

3. Maintenance schedule for fertilization, irrigation, and for planting areas.

D. Failure to provide the above submittals may result in the re-scheduling of Progress Maintenance Observations and to extend the 90 Calendar-Day Plant Establishment, Maintenance, and Site Care Period.

E. Notify Engineer in writing, prior to any of the progress maintenance observations of any conditions which may impede proper plant establishment and or growth.

F. Continuously maintain areas involved in Contract during progress of Work and during Plant Establishment, Maintenance, and Site Care Period.

G. Plant Establishment, Maintenance, and Site Care Period shall be extended beyond 90 days due to improper landscape maintenance and poor condition of planting at termination of the scheduled landscape maintenance. Continued landscape maintenance shall be at no additional cost to Department.

H. Any day that Contractor fails to adequately perform landscape maintenance, as determined necessary by Engineer, that day shall not be credited as one of the landscape maintenance working days.

I. Prior to being placed on landscape maintenance, submit a schedule of activities planned during Plant Establishment, Maintenance, and Site Care Period for Engineer's review and acceptance prior to start of landscape maintenance. Document scheduled changes and obtain acceptance by Engineer.

J. Final Maintenance Observation: Notify Engineer 14 days prior to completion of Plant Establishment, Maintenance, and Site Care Period for final maintenance observation. Prior to this observation, items determined to be deficient during Progress Maintenance Observations shall be completed and signed off by Engineer.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General: Materials and equipment shall be provided by Contractor, except as otherwise specified.

B. Water: Clean, potable, and fresh, as available from Department water source. If no water source is available, Contractor shall use water trucks.

C. Lawn Sod for Re-sodding: Match in-place sodded lawn.

D. Replacement Tree Guys, Stakes, Ties and Wires: Match in-place and accepted materials on Project Site.

E. Fertilizing and conditioning materials shall comply with the applicable requirements of the State of California Food and Agricultural Code. Fertilizing materials shall be packaged, first grade, commercial quality products identified as to source, type of material, weight, and manufacturer's guaranteed analysis. Fertilizing material shall not contain toxic ingredients or fillers in quantities harmful to human, animal, or plant life.

1. Fertilizing and Conditioning Materials: Submit a certificate of compliance stating that the materials meet Specifications.

a. Soil Sulfur: Guaranteed analysis of 99 percent sulfur (powder form).

b. Iron Sulfate: Guaranteed analysis of 20 percent iron derived from ferric and ferrous sulfate and 10 percent sulfur.

c. Gypsum: Hydrated calcium sulfate product containing 23 percent calcium and 18 percent sulfur with a guaranteed analysis of 84 percent calcium sulfate. (Powder form)

d. Commercial Fertilizer: Granular product having a chemical analysis of 12-12-12 unless otherwise specified on Drawings; free-flowing material delivered in unopened sacks. Do not use material which becomes caked or otherwise damaged.

e. Ammonium Sulfate: 21 percent ammoniacal nitrogen and 24 percent combined sulfur. (21-0-0)

f. Calcium Nitrate: 14.5 percent nitrate nitrogen, 1 percent ammoniacal nitrogen and 19 percent calcium

g. Calcium Ammonium: 13.5 percent nitrate nitrogen, 13.5. Nitrate: percent ammoniacal nitrogen and 8 percent calcium (27-0-0)

h. Triple Superphosphate: 45 percent P2O5 and 15.5 percent calcium (0-45-0)

i. Potassium Sulfate: 50 percent potash and 18 percent combined sulfur (0-0-50)

j. Ureaformaldehyde: 38 percent slow-release of methylene urea (38-0-0)

k. 21-7-14: 9.9 percent nitrate nitrogen, 11.1 percent ammoniacal nitrogen, 7 percent P2O5, 14.0 percent K2O, 1.4 percent calcium, 5.1 percent combined sulfur

l. Organic Soil Conditioner (no sewage sludge or biosolids):

    1) Humus material shall have an acid-soluble ash content of no less than 6 percent and no more than 20 percent. The organic matter content shall be at least 50 percent on a dry weight basis.

    2) The pH of the material shall be between 6 and 7.5.

    3) The salt content shall be less than 10 millimho/cm at 25 degrees C. (ECe less than 10) in a saturated paste extract.

    4) Boron content of the saturated extract shall be less than 1.0 part per million.

    5) Silicon content (acid-insoluble ash) shall be less than 50 percent.

    6) Calcium carbonate shall not be present if to be applied on alkaline soil.

    7) Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses, and the like, low in salts, low in heavy metals, free from weed seeds, free of pathogens, and other deleterious materials.

8) Composted wood products are conditionally acceptable (stable humus must be present). Wood based products are not acceptable which are based on red wood or cedar.

9) Sludge-based materials are not acceptable.

10) Carbon to nitrogen ratio is less than 25:1.

11) Compost shall be aerobic without malodorous presence of decomposition products.

12) Maximum particle size shall be 0.5 inch, 80 percent or more shall pass a No. 4 screen.

13) Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis:

| | | | | | |
|---|---|---|---|---|---|
| arsenic | 12 | copper | 150 | selenium | 10 |
| cadmium | 10 | lead | 50 | silver | 10 |
| chromium | 50 | mercury | 2 | vanadium | 200 |
| cobalt | 50 | molybdenum | 20 | zinc | 200 |
| nickel | 100 | | | | |

m. Organic Fertilizers:

| | |
|---|---|
| Blood meal | Feather meal |
| Bone meal | Rock phosphate |
| Fish emulsion | Alfalfa meal |
| K-Mag (sul-po-mag) (0-0-22) | |

F. Weed and Insect Control: Provide products conforming to City of Los Angeles herbicide/pesticide and/or integrated Pest Management Control Program.

PART 3 – EXECUTION

3.1 PREPARATION

A. Protection:

1. Protect new planting areas from damage from beginning of Work until sufficiently established or Final Acceptance.

2. Provide temporary protection fences, barriers, and signs as required to maintain protection.

B. Replacements:

1. Immediately treat or replace plants that become damaged or injured as a result of Contractor's operations or negligence, as directed by Engineer, at no additional cost to Department.

2. Replacement plants shall match size, condition, and variety of originally installed plants.

3.2 LANDSCAPE MAINTENANCE

A. Keep landscape areas free of debris.

B. Keep planted areas weed-free. Cultivate at intervals of not more than 10 days.

C. Maintain adequate protection of Work area. Repair damaged areas.

D. Between the 15th day and 20th day of Plant Establishment, Maintenance, and Site Care period, re-sod spots or areas within turf areas where normal turf growth is not evident. After 20th day, areas that are not acceptable to Engineer shall be re-sodded at no additional cost to Department.

E. Sweep clean paved areas at weekly intervals or more frequently, if deemed necessary, and hose down with high-pressure washers. Mechanical blowing is not permitted in planting zones.

3.3 EQUIPMENT

A. General: Use only the proper tool for each Project. Maintain tools in sharp, properly functioning condition. Clean and sterilize pruning tools prior to usage.

B. Insect and Disease Prevention: Take measures required to prevent introduction of insect or disease-laden materials onto Project Site.

3.4 TREE AND SHRUB CARE

A. Watering:

1. Maintain a large enough water basin around trees and shrubs so that enough water can be applied to establish moisture through major root zone.

2. When hand watering, use a water wand to break water force.

3. Replenish wood mulches to reduce evaporation and frequency of watering.

4. Regulate irrigation watering times to minimize erosion and gulleying.

B. Pruning:

1. General: No tree pruning is to be done without the field supervision of Engineer.

2. Trees:

a. Upon authorization of Engineer and field supervision, prune trees to:

1) Select and develop permanent scaffold branches that are smaller in diameter than trunk or branch to which they are attached, which have vertical spacing of from 18-inches to 48-inches and radial orientation so as not to overlay one another.

2) To eliminate diseased or damaged growth.

3) To eliminate narrow V-shaped branch forks that lack strength.

4) To reduce toppling and wind damage by thinning out crowns.

5) To maintain growth within space limitations.

6) To maintain a natural appearance and to balance crown with root mass.

b. Under no circumstances, shall stripping of lower branches (“raising-up”) of young trees be permitted.

c. Retain lower branches in a pinched (“tipped-back”) condition with as much foliage as possible to promote caliper trunk growth.

d. Cut lower branches flush with trunk only after tree is able to stand erect without staking or other support.

e. Remove sucker growth.

f. Thin evergreen trees and shape when necessary to prevent wind and storm damage.

g. Multi-trunked trees are to retain their natural appearance and be pruned only under the field supervision of Engineer.

3. Shrubs:

    a. Overall objective of shrub pruning is same as for trees.

    b. Do not clip shrubs into balled or boxed forms unless approved initially by Engineer.

    c. Make pruning cuts on lateral branches or buds flush with trunk.

    d. Do not “stub” branches.

C. Tree Staking and Guying:

1. Restake, tighten, and repair damaged ties and guys.

2. Reset to proper grades or upright position, trees that are not in their proper growing position.

3. Inspect stakes and guys to prevent girdling of trunks or branches and to prevent rubbing that may cause bark wounds.

D. Weed Control:

1. Keep planted areas manually free of weeds.

2. Avoid frequent soil cultivation that destroys shallow surface roots.

3. Replenish lost wood mulch to reduce weed growth.

E. Insect, Disease, and Rodent Control:

1. Maintain insect and disease control during Plant Establishment, Maintenance, and Site Care Period.

2. No chemical spraying shall be applied without the prior written approval of Engineer. Submit proposed chemical and application method for review and approval.

3. Control rodents and other pests using professional licensed pest control operators. Do not use mechanical traps.

F. Fertilization:

1. Fertilize planting areas with application of specified fertilizer at the rate of 7-1/2 pounds per 1,000 square feet or per recommendations of the import topsoil horticultural suitability report 30 days after planting. Defer to application rates of the topsoil horticultural suitability report if one exists.

2. Repeat fertilizer application at 30-day intervals until end of Plant Establishment, Maintenance, and Site Care Period.

G. Replacement of Plants: Replace dead, dying and missing plants with plants of like size and condition to those that were originally installed at no additional cost to Department.

3.5 GROUND COVER CARE

A. Weed Control: Control weeds by hand so as to cause minimal damage to plant materials.

B. Watering: Water enough so that moisture penetrates throughout root zone and only as frequently as necessary to maintain healthy growth.

C. Fertilizing: Fertilize as specified under Tree and Shrub Care Article of this Section.

D. Edge ground cover to keep in bounds and trim top growth as necessary to achieve an overall even appearance. Specified groundcovers have been selected for their natural form and height. No shearing of top growth shall occur. No shearing or straight clipping of sides of groundcover is acceptable.

E. Replace dead, dying, and missing plants with plants of a like size and condition to those that were originally installed at no additional cost to Department.

3.6 ORNAMENTAL GRASS AND MEADOW PLANTING CARE

A. Weed Control: Control weeds by hand so as to cause minimal damage to plant materials. Apply bark mulch, spreading 1 to 2 inches between grass bunches after cutting back the grasses as scheduled below.

B. Watering: Water once a week thoroughly; twice a week in hot summer heat spells. Several water cycle starts shall be programmed in order to thoroughly wet the soil.

C. Fertilizing: Fertilize with 5 pounds of 16-6-8 per 1,000 square feet after cut-back.

D. Cutting Back: Cut back foliage to 6 inches in the spring before growth resumes. If plants look ‘scruffy’ or are damaged, grasses can be cut back any time of year.

3.7 TURF CARE

A. General: The review and approval of edge trimming equipment and techniques shall be required by Engineer.

B. Mowing and Edging:

1. Commence mowing of turf when turf has reached a recommended height for specified species.

2. Mow weekly after first cut.

3. Turf shall be well established and free of bare spots and weeds prior to Final Acceptance.

4. Remove excess grass clippings at each mowing and remove from Project Site. No clippings shall be spread in the planting zone.

5. Trim turf at paving edges at least twice monthly or as needed for a neat appearance.

6. Blow or vacuum grass clippings from paved areas.

C. Watering: Water turf at such frequency as weather conditions require to replenish soil moisture below root zone and maintain healthy turf growth.

D. Fertilizing: Fertilize turf areas with applications of turf fertilizer at 30-day intervals until end of Plant Establishment, Maintenance, and Site Care Period.

E. Weed Control: If needed, control broadleaf weeds with selective herbicides to be submitted to and approved by Engineer.

3.8 PALM CARE

A. Refer to PALM TREES Section for requirements.

## 3.9 IRRIGATION SYSTEM

A. Irrigation shall be performed between 1:00 a.m. and 5:00 a.m. at days and duration in compliance with City of Los Angeles Water Conservation Ordinance. To the extent that it can be performed through automatic control, irrigation shall be scheduled to supply quantities and frequencies consistent with seasonal requirements of the plant materials in the landscape. Controller programs shall be adjusted as dictated by the weather.

B. Maintain equipment, service valves, program controllers, and other system components in operating condition.

C. Provide maintenance of irrigation system consisting of cleaning and adjusting sprinkler nozzles, repairing damaged equipment, servicing valves, programming controllers, and other activities required during Plant Establishment, Maintenance, and Site Care Period.

D. Adjust sprinkler heads and risers, clean and flush heads, lines, emitters, screens and remove obstructions as necessary to provide adequate coverage to landscaped areas, to prevent excessive runoff and erosion, and to prevent watering hardscape. Repair damage to on-site (new and existing) irrigation system immediately.

E. Test irrigation systems the first and third Mondays of each month and immediately report to Engineer any and irrigation system problems not correctable as described in Paragraph D of Irrigation System Article.

F. Prevent over-spraying into accessible paths of travel and paved surfaces.

## 3.10 HARDSCAPE AND OTHER NON-PLANTED AREAS

A. Remove and dispose of accumulated debris, including plant materials and litter from hardscape including pavements, walkways, ramps, stairs, pathways, driveways, mulched areas, and other non-planted areas.

B. Empty trash containers, ash receptacles, and recycling receptacles.

C. Control weeds at mulched and other non-planted areas.

D. The presence of excessive refuse or evidence of dumping shall be immediately reported to Engineer.

E. Keep paved areas and surfaces clean and washed. Washing of surface areas shall comply with City of Los Angeles Water Conservation Ordinance.

## 3.11 FINAL INSPECTION AND ACCEPTANCE

A. At completion of Plant Establishment, Maintenance, and Site Care Period, schedule a final walk-through with Engineer.

B. Engineer, Contractor, and other personnel deemed necessary by Engineer shall be present at the final walk-through.

C. If during the final walk-through Engineer is of the opinion that landscape maintenance has been substantially completed in conformance with this Section, written notice of recommendation to allow Contractor to be released from Project shall be submitted to Department for approval. This report shall note any incomplete “punch list” items from final walk-through and a date on which these items must be completed. Complete remaining “punch list” items within 5 working days after date of the final walk-through.

## 3.12 CLEANING

A. Housekeeping: Provide weekly cleaning of site furnishings and appurtenances with non-abrasive cloth. Wipe down benches, bollards, seat walls, weir walls, trash receptacles, recycling light poles, receptacles, and similar items.

B. Final Clean-up:

1. Upon completion of landscape maintenance, remove rubbish, waste, and debris resulting from Contractor’s operations.

2. Repair scars, ruts, or other marks in landscaped areas caused by Contractor.

3. Remove equipment, implements of service and leave Work area in a neat and clean condition as accepted by Engineer. Sweep clean and hose down paved areas.

4. Wipe down metal surfaces including railings, bollards, benches, trash receptacles, drinking fountains, bike racks, and similar items.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Decomposed granite paving

B. Rockscape

1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 32 11 24 - Crushed Miscellaneous Base

C. Section 32 13 14 - Concrete for Exterior Improvements

D. Section 32 13 15 - Architectural Cast-In-Place Concrete

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Planting and Irrigation System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. Reference Specifications (RS):

Section 200 - Rock Materials

Subsection 200-2.7 - Disintegrated Granite

1.5 SUBMITTALS

A. Make submittals for items included in Notice to Proceed on the schedules agreed upon.

B. Product Data: Complete lists of proposed items for approval. Include manufacturer's name and address, specific trade names; catalog numbers complete with installation instructions, illustrations, and descriptive literature. Clearly mark or underline proposed items in red; list sources of materials.

C. Samples of the following items:

1. Rockscape Sizes and Color:

a. Samples of rock that reflect typical size and color range of type.

b. The approved samples shall establish the design appearance of the finishes specified.

2. Decomposed Granite Paving:

a. 5-pound sample of decomposed granite for each color.

b. Submit cut sheets of stabilizer product and sample “puck” for each color.

c. Sieve analysis for grading of decomposed granite.

d. Mix design describing the source, color, and weight of aggregate, gallons of pre wet water, and amount of organic binder.

D. Procurement List: Use the approved lists of items proposed under this Section for procurement without deviation unless otherwise authorized in writing by Engineer.

E. Maintenance Instructions: Submit copies of manufacturer’s specified maintenance practices for each type of paving and accessory as required.

1.6 QUALITY ASSURANCE

A. Qualifications of Workers:

1. Decomposed Granite Paving: Engage experienced and skilled installer, who has successfully completed decomposed granite installations similar in material, design, and extent to that indicated for Project.

B. On-Site Mock-Ups: Prior to placement, provide on-site mock-ups of the following items:

1. Rockscape:

a. Once samples have been approved, and prior to placement of rockscape, provide an on-site 5-foot by 10-foot mock-up of each rockscape type as specified in Notice to Proceed for Engineer's approval. Mock-up shall be completed 10 Calendar Days in advance of construction for Engineer’s approval.

b. Upon request, Engineer may require minor modifications to be made to the mock-ups. The revised mock-ups shall be provided at Contractor's sole cost and expense.

c. Once the mock-ups have been approved by Engineer, retain approved mock-ups during construction as standard for judging completed Work.

d. Remove the mock-up(s) from Project Site upon completion of Directive.

2. Decomposed Granite Paving:

a. Furnish one 4-foot by 12-foot, 4-inch thick mock-up of each decomposed granite and crushed stone paving material as specified in Notice to Proceed. The mock-up shall include proposed curbs, headers or containment systems. Locate the mock-up in a safe and convenient place.

b. The approved mock-up(s) shall be the standard(s) for decomposed granite and crushed stone paving Work.

c. Completely remove the mock-up(s) from Project Site upon completion of Project.

C. Regulatory Requirements:

1. Sandblasting shall meet South Coast Air Quality Management District (SCAQMD) requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project Site in such manner than no damage occurs to the products.

B. Notify Engineer 7 Calendar Days prior to the time of delivery.

C. Store materials and products in a dry and protected location. Protect from drying, breaking, rusting, deformation, staining, and moisture damage.

1. Cement delivered to Project shall be packed in strong paper or jute bags with brand name and manufacturer’s name stamped thereon. Cement shall be stored under cover. Immediately remove cement that has become wet or shows signs of caking or deterioration of any kind from Project Site. Concrete materials shall be protected from contamination.

2. Cover decomposed granite materials with plastic to prevent exposure to rainfall, debris, or removal by wind.

D. Brand of cement, stabilizing binder, source of aggregate, or paving materials shall not be changed during course of Work without prior written approval from Engineer.

1.8 ENVIRONMENTAL CONDITIONS

A. Do not install stabilized decomposed granite paving during rain or other inclement conditions.

1.9 VERIFICATION OF DIMENSIONS AND QUANTITIES

A. Verify scaled dimensions and quantities prior to start of Work.

B. Notify Engineer of discrepancies between Drawings and Specifications and actual Project Site conditions which would affect the execution of installation Work. Do not Work in areas where discrepancies occur until instructed by Engineer.

PART - 2 PRODUCTS

2.1 MATERIALS

A. Crushed Miscellaneous Base (CMB): As specified in CRUSHED MISCELLANEOUS BASE Section.

B. Concrete Paving and Curbs:

1. Comply with provisions of CONCRETE FOR EXTERIOR IMPROVEMENTS Section for materials not specified in this Section necessary to perform Work of this Section.

C. Decomposed Granite Paving:

1. Decomposed Granite shall be in conformance with RS Subsection 200-2.7. Color shall be Desert Gold from Decorative Stone Solutions. Manufacturer: Decorative Stone Solutions, 197 Woodland Pkwy, Suite 104 # 813, San Marcos, CA, 92069, Phone: 800-699-1878, Email: info@decorativestonesolution.com.

2. Stabilizer Binder:

a. Patented, nontoxic organic binder that is colorless and odorless concentrated powder that binds decomposed granite and crushed stone together to produce a firm surface.

b. Manufacturer: Stabilizer Inc., (800) 336-2468.

3. Water: Fresh, clean, potable.

4. Soil Separator Fabric: Woven or nonwoven geotextile fabric manufactured from polyester or polypropylene fibers, with a permeability rating 10 times greater than that of soil on which decomposed granite is found and an apparent opening size small enough to prevent passage of fines from leveling course into graded aggregate of base course below. Manufacturer: Mirafi, Inc., (800) 223-0512.

D. Rockscape:

1. Manufacturer: Southwest Boulder and Stone, (417) 822-1010.

   a. Rockscape TBoulders:

      1) Model/Color: Crushed Rock and Gravel / Baja Cresta Rubble, Size: 4" - 8"

   b. Rockscape Type B:

      1) Model/Color: Bolders / Baja Cresta Rubble, Size 12" - 18"

   c. Rockscape Type C:

      1) Model/Color: Crushed Rock and Gravel / Baja Cresta Rubble, Size: Mixture of 4" - 8" and 12" - 18"

2. Natural irregularities in shapes are desirable; however, fractures, chips, or other unnatural damage shall not be accepted.

3. Place stone as close together as possible to provide a textured dry river bed appearance.

4. Backfill with dry, washed concrete, or beach sand to fill the voids and for stabilization to the satisfaction of Engineer. Brush or water blast out excess sand.

5. Grout with cement slurry when grouting is indicated on Drawings or as directed by Engineer.

2.2 MIXES

A. Decomposed Granite Paving:

1. Aggregate Mix General Content: Natural pavement mix as supplied by authorized blender with not less than 12 percent emulsion by dry weight of the aggregate.

2. Decomposed granite and stabilizer shall be mixed and integrated prior to delivery to Project Site. No mixing shall be performed on-site.

3. Sieve Analysis: Washed natural crushed granite and stone free of clay, friable materials, and debris and graded in conformance with ASTM C136/C136M within the following limits:

| Seive Size | Percent Passing |
|---|---|
| 3/8-inch (9.5 mm) | 100 |
| No. 4 (4.75 mm) | 91 |
| No. 8 (3.36 mm) | 73 |
| No. 16 (1.16 mm) | 52 |
| No. 30 (600 mm) | 34 |
| No. 50 (300 mm) | 21 |
| No. 100 (150 mm) | 13 |
| No. 200 (75 mm) | 10 |

1. Color: Desert Gold as supplied by Decorative Stone Solutions, (800) 699-1878.

2. Stabilizer blinder for decomposed granite shall be by Stabilizer Solutions, Inc, (800) 336-2468.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Inspections: Verify that conditions are satisfactory for installation of paving and surfaces. Do not proceed with Work specified in Notice to Proceed until unsatisfactory conditions have been corrected.

B. Acceptance: Obtain Engineer's approval of substrates before installation of paving.

C. Special Precautions: Guard against damaging existing pavements and planting where new paving is to be installed.

## 3.2 DECOMPOSED GRANITE INSTALLATION

A. Contractor shall furnish and place decomposed granite on compacted and sterilized subgrade in areas as indicated on Drawings.

B. Thoroughly blend the stabilizer into the decomposed granite by mechanical means in conformance with manufacturer's written instructions.

C. Prior to placing the decomposed granite surfacing, subgrade shall be cleaned of foreign substances. Ruts or soft, yielding spots that may appear in subgrade, areas having inadequate compaction, and deviations of the surface from requirements specified or shown on Drawings shall be corrected by loosening, removing, and by adding approved materials, reshaping to line and grade, and recompacting to specified density requirements and as approved by Engineer.

D. Apply soil sterilant in conformance with manufacturer's written instructions and applied by or under the direct supervision of someone holding a State of California Qualified Application Certificate.

E. Material shall be level to a uniform thickness so that the layer, after compaction, shall not be less than the indicated thickness.

F. Decomposed granite shall be compacted to at least 85 percent of maximum density obtainable.

G. Finish surface shall not vary more than 0.02 foot from required grades adjacent to both paved and unpaved areas.

H. Adjustments shall be made in placing, spreading, or finishing procedures as may be directed by Engineer to obtain a uniform layer thickness and true grades, to minimize segregation and degradation where pertinent, to reduce or increase water content, and to ensure a satisfactory course.

I. Materials found unsatisfactory shall be replaced or reworked at Contractor's sole cost and expense to produce satisfactory material.

## 3.3 DECOMPOSED GRANITE PAVING

A. Blending Stabilizer:

1. Blend 12 pounds of stabilizer powder per ton of decomposed granite screenings. It is critical that stabilizer be thoroughly and uniformly mixed through the decomposed granite screenings.

B. Placement of Decomposed Granite Screenings:

1. Install soil separator fabric on compacted subgrade. Overlap seams at least 6 inches. Protect the fabric from sun exposure if exposed for more than 72 hours before placing decomposed granite screenings.

a. Spread and level the stabilized decomposed granite screenings to the 4 inch depth. Install decomposed granite in two lifts 2 inches each.

b. Grade and smooth the stabilized decomposed granite screenings in accordance with the approved sample.

c. Apply water until moisture penetrates to the full depth of the stabilized decomposed granite screenings. It is critical that the full section of the stabilized decomposed granite screenings receive water at this time.

d. Upon thorough moisture penetration and after surface water has disappeared, compact the stabilized decomposed granite screenings to within 90 percent relative compaction. Care shall be taken in compacting the decomposed granite screenings adjacent planting, irrigation systems, and edgings.

e. Allow the finished surface enough time to dry completely before allowing traffic.

f. Finished surface shall be smooth and even and perform to slope indicated on Drawings.

## 3.4 DECOMPOSED GRANITE PAVING PROTECTION

A. Protect pavement surface against equipment and traffic until pavement has cured sufficiently to support traffic without marring, rutting, tearing, distressing, or damaging the pavement in any way.

B. Provide warning signs, barricades, and protection fencing to protect pavement from traffic.

C. Provide drainage during construction to prevent water from collecting or standing on areas to be paved or areas of freshly placed pavement.

D. Natural Pavement: Protect surface and edges from traffic for minimum 72 hours by using barricades, fencing, or other accepted methods.

## 3.5 RIVER-RUN STONE BED

A. Place stone as close together as possible to provide a textured dry river bed appearance.

B. Backfill with dry, washed concrete, or beach sand to fill the voids and for stabilization to the satisfaction of Engineer. Brush or water blast out excess sand.

C. Grout with cement slurry when grouting is indicated on Drawings or as directed by Engineer.

## 3.6 CLEANING

A. Upon completion of Work, a final inspection for acceptance shall be performed by Engineer.

B. Sweep concrete sidewalks, pavements, and crosswalks, and remove rubbish, waste, and debris resulting from this operation off-site or as directed by Engineer.

C. Wash concrete paving free of stains, discoloration, dirt, and other foreign material immediately prior to final acceptance.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Contractor-furnished base material

## 1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 32 12 17 - Asphalt Concrete Paving

C. Section 32 13 14 - Concrete for Exterior Improvements

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. The quantity of base material shall be measured per cubic yard compacted in place.

2. Payment for Work of this Section shall be paid under the Crushed Miscellaneous Base and the Crushed Miscellaneous Base for Walkway bid items of Bid Proposal Line Items.

## 1.4 REFERENCES

A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

B. Reference Specifications (RS):

Section 200 - Rock Materials

Subsection 200-2.4 - Crushed Miscellaneous Base

Section 301 - Subgrade Preparation, Treated Materials, and Placement of Base Materials

Subsection 301-2 - Untreated Base

Subsection 301-2.2 - Spreading

Subsection 301-2.3 - Compacting

1.5 SUBMITTALS

A. Submit to Engineer list of equipment to be used for hauling, dust control during hauling, and placing crushed miscellaneous base (CMB) prior to usage on Project.

B. Submit proposed trucking delivery schedule and haul route.

C. Submit the following to Engineer 30 Calendar Days prior to delivery of Contractor-furnished CMB to Project Site:

1. Written documentation to identify the proposed CMB source and previous uses of the site from which CMB originated.

2. Sieve analysis conforming to ASTM C136/C136M.

1.6 QUALITY ASSURANCE

A. Notify Engineer when base course or portion thereof has been placed and compacted in conformance with the requirements shown on Drawings and in this Section. Do not place pavement surface or ballast until so directed by Engineer.

B. If compaction tests indicate that the crushed miscellaneous base course does not meet specified requirements, remove defective Work and replace. Retest costs shall be responsibility of Contractor.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Load, transport, and deliver base materials to Project Site from the source through approved haul routes.

B. Control dust from loading and hauling operations by sprinkling with a water truck or utilize other methods acceptable to Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Contractor-furnished crushed miscellaneous base shall conform to RS Subsection 200-2.4, fine gradation.

B. Import CMB, Environmental Requirements (from sites off of Department property):

1. CMB source area shall not be located in:

a. Sites undergoing environmental cleanup.

b. Other sites where hazardous materials were used or hazardous wastes were generated (gasoline stations, dry cleaners, oil refineries, painting facilities, metal processing shops, and other similar sites).

2. Department retains the right to refuse any potential CMB material for use at any of its construction sites.

3. Provide written documentation that identifies proposed CMB source and previous uses of the land from where CMB shall originate. Information shall be submitted to Engineer for review and approval prior to delivery of CMB material.

## PART 3 - EXECUTION

### 3.1 EQUIPMENT

A. Provide and maintain in operating condition equipment, tools, and machines used in performance of Work of this Section.

B. Contractor shall have major equipment items available for inspection by Engineer. Correct deficiencies in quality, quantity, or types of equipment prior to commencing Work. This inspection and approval shall in no way relieve Contractor from the obligation to provide the equipment required to perform Work of this Section.

### 3.2 PREPARATION OF SUBGRADE

A. Subgrade shall conform to lines, grades, cross sections, and density shown on Drawings prior to the placing of the base course. Do not place base course until the subgrade has been inspected and approved by Engineer.

B. Do not place base course when the subgrade is sufficiently wet that its surface can be marred by construction equipment.

C. Protect finished subgrade course from disturbance by traffic or other operations and maintain until base course is placed.

3.3 CONSTRUCTION

A. Place, spread, and compact base course in conformance with RS Subsections 301-2.2 and 301-2.3 except that relative compaction shall be 97 percent.

3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Refer to BASIC SITE MATERIALS AND METHODS Section, Field Quality Control Article, for Engineer's determination of maximum dry density and optimum moisture content, and for field-testing of compacted crushed miscellaneous base.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Asphalt concrete

B. Tack coat

1.2 RELATED SECTIONS

A. Section 32 11 24 - Crushed Miscellaneous Base

B. Section 32 17 13 - Parking Bumpers

C. Section 32 17 23 - Pavement Markings

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for asphalt concrete pavement shown on Drawings shall be paid under the Asphalt Concrete Pavement bid item of Bid Proposal Line Items as measured by the tonnage on the weigh tickets from the plant.

2. Refer to TRENCHING AND BACKFILLING Section concerning costs for asphalt concrete trench resurfacing.

1.4 REFERENCES

A. AASHTO T 312 - Standard Method of Test for Preparing and Determining the Density of Asphalt Mixture Specimens by Means of the Superpave Gyratory Compactor.

B. ASTM C131/C131M - Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

C. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

D. ASTM D2726/D2726M - Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Asphalt Mixtures.

E. ASTM D2950/D2950M - Standard Test Method for Density of Asphalt Mixtures in Place by Nuclear Methods.

F. ASTM D6307 - Standard Test Method for Asphalt Content of Asphalt Mixture by Ignition Method.

G. Reference Specifications (RS):

Section 200 - Rock Materials

Subsection 200-1 - Rock Products

Section 203 - Bituminous Materials

Subsection 203-1 - Paving Asphalt

Subsection 203-2 - Liquid Asphalt

Subsection 203-3 - Emulsified Asphalt

Subsection 203-6 - Asphalt Concrete

Section 213 - Engineering Geosynthetics

Subsection 213-4 - Paving Fabric

Section 302 - Roadway Surfacing

Subsection 302-5 - Asphalt Concrete Pavement

1.5 DEFINITIONS

A. Project Mix Design: Contractor’s Project specific asphalt concrete formula, including individual gradation values and other data conforming to RS Subsection 203-6.3.

B. Project Aggregate Gradation Control Band: Percentage passing sieve ranges derived by adding and deducting tolerance range values to Contractor’s approved Project Mix Design percentage passing sieve values. Tolerance range values are shown in the Production W and Y Mix Tolerances Table, and Production RS Mix Tolerances Table.

1.6 SUBMITTALS

A. Copies of the supplying vendor’s asphalt test report required by RS Subsection 203-1.

B. List of equipment to be used for placing asphalt concrete prior to usage on Project.

C. Copies of the asphalt concrete Project Mix Design, including gradation and binder content required by RS Subsection 203-6.

1. Include coarse aggregate percentage wear test results from RS Subsection 200-1.2 and ASTM C131/C131M.

D. Gradation sample from mixing plant.

E. Submit proposed area(s) within cold mill limits shown on Drawings to place crack filler for approval prior to crack filler application.

1.7 QUALITY ASSURANCE

A. Have major equipment items available for inspection by Engineer. Correct deficiencies in quality, quantity, or types of equipment prior to commencing Work. This inspection and approval shall in no way relieve Contractor from the obligation to provide the equipment required to perform Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Tack coat shall conform to RS Subsection 203-1, either PG 64 -10 or PG 64 -16, or SS-1 emulsified asphalt in conformance with RS Subsection 203-3.

B. Paving asphalt shall conform to RS Subsection 203-1 except reclaimed asphalt paving pavement (RAP) shall not be used.

C. Aggregates:

1. Crushed slag shall not be used for coarse or fine aggregates.

2. Coarse aggregates shall conform to the requirements for maximum percentage wear in RS Subsection 200-1, Table 200-1.2.1 (B) as tested under ASTM C131/C131M.

3. The minimum specific gravity of coarse aggregate shall be 2.58.

4. Material passing each aggregate sieve size shall be 100 percent by weight crushed rock with 2 or more fractured faces.

5. Fine aggregates shall be 100 percent by weight rock dust.

D. Asphalt concrete shall conform to RS Subsection 203-6 except that reclaimed asphalt pavement (RAP) shall not be used.

1. Asphalt concrete class and grade shall be as designated on Drawings.

E. Asphalt concrete for class and grade shown on Drawings shall conform to RS Subsection 203-6 and as follows:

1. Production Asphalt Concrete Mix Tolerances: Production RS Mix Tolerances Table establishes a Project Mix Design control band which applies to Contractor's approved Project Mix Design submittal.

a. Production asphalt concrete mix tolerance percentage values for each sieve may be added to or deducted from the approved Project Mix Design percentage passing values for each sieve. The resulting values still apply if they result in Project Aggregate Gradation Control Band outside of Percentage Passing Sieves columns for the class of asphalt concrete shown on Drawings and shown in RS Subsection 203-6, Table 203-6.4.4.

b. Production asphalt concrete aggregate gradations, asphalt binder, and air voids shall not deviate from the approved Project Mix Design more than the tolerances shown in Production RS Mix Tolerances Table included in this Section.

| Production RS Mix Tolerances Table | |
|---|---|
| | |
| Sieve Size | Tolerance Range |
| 1-1/2 inches | ±0 |
| 1 inch | ±2 |
| 3/4 inch | ±4 |
| 1/2 inch | ±5 |
| 3/8 inch | ±6 |
| No. 4 | ±6 |
| No. 8 | ±5 |
| No. 30 | ±4 |
| No. 50 | ±3 |
| No. 200 | ±1 |
| Air Binder Percent | ±0.45 |
| Air voids - lab samples | -1.5 to +0.5%* |
| Air voids - field samples | -2.0 to +1.0%** |
| * The average air void volume of lab-compacted samples from a day's production shall fall between 2.5 and 4.5 percent with a standard deviation less than 0.65. | |
| | |
| ** The air void volume of each in place sample shall fall between 2.0 and 5.0 percent. | |

2.2 CRACK FILLER

A. Crack filler shall be as specified in SLURRY SEAL Section.

2.3 SOURCE QUALITY CONTROL

A. Allow Engineer access to the mixing plant 30 Calendar Days prior to start of paving operations and at any time thereafter for verification of weights or proportions, character of materials used and determination of temperatures used in the preparation of asphalt concrete mix.

B. Engineer shall verify acceptability of asphalt concrete aggregate gradations from plant extractions tested in conformance with ASTM D6307. Aggregate gradations shall be determined in conformance with ASTM C136/C136M Sieve Analysis.

PART 3 – EXECUTION

3.1 PREPARATION

A. Place base material in conformance with CRUSHED MISCELLANEOUS BASE Section.

B. Clean base course prior to paving operations. Clean surfaces to receive overlay prior to tack coating. Remove dirt, trash, oil, loose asphalt concrete debris, vegetation, and standing water.

C. Wherever asphalt concrete paving does not terminate against a curb, gutter, or another pavement, furnish and install header at the line of termination prior to placing asphalt concrete in conformance with RS Subsection 302-5.5.

D. Carefully lay joints between existing hard-surface pavements and new pavements; between hard-surface structures permanently embedded in the grade and new pavements; or between successive days' Work in such a manner as to ensure a continuous bond between existing and new sections.

1. Expose, clean, and cut edges of existing pavement or new asphalt concrete placed in the previous days asphalt concrete in place to straight, vertical surfaces.

2. Lay joints between same-day successive runs adjacent to new asphalt in conformance with RS Subsection 302-5.7.

E. At joint locations described in Paragraph E of this Article, or areas to be overlaid, apply tack coat to the existing surfaces to be joined in conformance with RS Subsection 302-5.4 prior to placing asphalt concrete.

F. Do not place asphalt concrete until Engineer approves batch plant gradation samples.

G. Do not place asphalt concrete until the base material has been approved by Engineer.

## 3.2 CONSTRUCTION

A. Perform paving during daylight hours.

B. Paving shall be continued uninterrupted and as expeditiously as possible once commenced.

C. Construct asphalt concrete paving in conformance with RS Subsection 302-5. Exceptions:

1. Mixes shown in RS Table 203-6.4.4 shall be compacted to 98 percent relative density unless indicated otherwise on Drawings.

2. Classes W and Y asphalt concrete shall be compacted to 98 percent relative density as determined in conformance with AASHTO T 312 with 75 gyrations.

D. Provide and maintain in good operating condition equipment, tools, and machines used for constructing asphalt concrete pavement.

## 3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Testing and inspection of asphalt concrete paving mix and testing of placed asphalt concrete paving shall be performed by Engineer.

2. Engineer shall determine in-place densities and other specified material properties by nuclear methods in conformance with ASTM D2950/D2950M and by cores in conformance with ASTM D2726/D2726M and AASHTO T 312. Remove and replace materials not complying with specified material property requirements.

3. If compaction tests indicate that the asphalt concrete paving does not meet specified requirements, re-test costs shall be at sole cost and expense of Contractor.

4. Asphalt concrete pavement that Engineer determines to be out of conformance with the gradation and compaction requirements of this Section shall be subject to removal. If, after initial rejection, non-conformance continues, stop asphalt concrete material deliveries entirely until Engineer is satisfied that future deliveries shall conform to the requirements of this Section. Contractor shall be solely responsible for any delays to Project schedule resulting from rejected asphalt concrete material.

5. Flood Test:

    a. Flood asphalt pavement with water to check for positive drainage.

    b. Provide materials and equipment for flood testing.

    c. Perform test in Engineer's presence.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Site Work Concrete:

1. Curbs
2. Gutters
3. Concrete pavement (Standard gray)
4. Reinforcement bars
5. Fiber reinforcement
6. Catch basins
7. Cast-in-place vaults
8. Sidewalks (Standard gray)
9. Fence footings
10. Sign post footings
11. Guard post footings
12. Concrete pads for electrical and mechanical equipment
13. Maintenance holes
14. Water pipe thrust blocks
15. Site furnishing footings
16. Concrete Mowstrip (Standard gray)

B. Slurry: Duct bank encasement.

C. Other non-wharf and non-building concrete structures as shown on Drawings.

D. For Work shown on Drawing No. 1-3302A and for Work shown on Drawing No. 1-3472A sheets SS-201 through SS-216 and SE-01 through SE-08, refer to Appendix "H" of Specifications.

1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 07 92 00 - Joint Sealants

C. Section 26 00 01 - Basic Electrical Materials and Methods

D. Section 31 00 00 - Earthwork

E. Section 32 31 13 - Chain Link Fences and Gates

F. Section 33 40 01 - Storm Drainage

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary.

B. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide.

C. ACI PRC-347 - Guide to Formwork for Concrete.

D. ACI SPEC-301 - Specifications for Concrete Construction.

E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

F. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.

G. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.

H. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

I. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

J. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

K. ASTM C88/C88M - Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.

L. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

M. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

N. ASTM C150/C150M - Standard Specification for Portland Cement.

O. ASTM C470/C470M - Standard Specification for Molds for Forming Concrete Test Cylinders Vertically.

P. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

Q. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

R. ASTM C1116/C1116M - Standard Specification for Fiber-Reinforced Concrete.

S. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

T. Reference Specifications (RS):

Section 200 - Rock Materials

Section 201 - Concrete, Mortar, and Related Materials

Section 302 - Roadway Surfacing

Section 303 - Concrete and Masonry Construction

1.5 SUBMITTALS

A. Submit concrete mix design to Engineer for review.

B. Submit manufacturer’s data sheet, including the following items

1. Manufacturer’s printed batching and mixing instructions.

2. Proposed fiber reinforcement materials including application rate per cubic yard of concrete.

C. Submit shop drawings for reinforcing steel in conformance with ACI CODE-318. Provide bending diagrams and assembly diagrams. Indicate splicing, laps of bars, shapes, dimensions, and details of bar reinforcing, accessories, and concrete cover. Do not scale dimensions from structural Drawings to determine lengths of reinforcing steel. Reproductions of Drawings are unacceptable.

D. Submit construction joint layout showing alternating pour areas and sequential pour schedule, identify joint types, layout paving types and sequence of construction, including 7 day cure time, prior to fabricating reinforcement.

E. Submit delivery tickets from plant for each load of concrete placed. Each ticket shall state quantities by weight of each component of the load (cement, sand, water, and the like).

F. Submit certificate of compliance signed by the supplier of fly ash identifying the type of fly ash and certifying that fly ash complies with ASTM C618.

G. Submit certification that aggregates meet the requirements of ASTM C33/C33M Appendix XI for reactivity.

H. Submit certification that the aggregates meet the soundness requirements of ASTM C33/C33M when tested in conformance with the requirements of ASTM C88/C88M using a sodium sulfate solution.

I. Submit two 12 inch long samples of waterstops and construction joint devices.

J. Submit shop drawings for expansion and control joint locations for cast-in-place concrete.

1.6 QUALITY ASSURANCE

A. Department Testing Laboratory (Test Lab) shall perform tests in conformance with RS Subsection 201-1.1.5.

1. Test Lab shall perform sieve analysis of aggregates in conformance with ASTM C136/C136M.

2. Test Lab shall provide certificate of compliance for bottoms of footings and pads prior to placing reinforcing bar and concrete.

3. Advise Test Lab 72 hours in advance of the beginning of operations to allow time for completion of quality tests and for assignment of laboratory personnel.

4. Provide and deliver to Test Lab, representative samples of materials which require testing and are proposed to be used on Project (coarse and fine aggregate, cement, and the like).

5. When requested, furnish copies of test reports of shipments of concrete to Engineer and Test Lab.

6. Shrinkage tests and tolerances.

B. Schedule Engineer's registered deputy building inspection prior to placing concrete and at other times as Drawings require.

C. In addition to test cylinders required by Contractor’s own testing and quality control, Contractor shall make for Department four 6 inch diameter by 12 inch long test cylinders for each light pole foundation, for every 5,000 square feet of slab area, and every 150 cubic yards of other types of concrete placement. A minimum of 4 cylinders shall be made for each day’s pour regardless of cubic yardage, or for each change in mix design. Upon notification, dispose of any cylinders not tested by Department.

1. Furnish certified technicians and equipment necessary to obtain and handle the samples at Project Site or at other locations where materials are located.

2. Make and cure cylinders in conformance with ASTM C31/C31M, standard cured method. Cylinder molds shall conform to ASTM C470/C470M.

3. Label cylinders with the date of sampling, the class and mix proportions of the concrete, and Work location of the pour from which the sets of samples were taken. Identify parent concrete structure from which samples were taken, and Drawing page number. Identify cylinders with the same identification system used on Drawings for the parent concrete structure. Use same identification system for samples Contractor requires for its own use.

4. Coordinate with Engineer for pick up of cylinders from field curing location between 24 to 72 hours after being cast. Avoid damage to cylinders and loss of lids and identifying labels during handling. Failure to comply with the provisions of this Section regarding cylinder handling may be cause for rejection of the concrete structure. Engineer may further require performance of any and necessary alternative strength tests at sole cost and expense of Contractor.

5. Engineer may increase the required number of cylinders if the specified concrete strength is not being attained consistently or reduce the number if Engineer determines that high concrete strengths are consistently produced and the concrete and curing processes are uniform.

6. Contractor shall provide evidence that the concrete structures have met strength and other requirements as specified in Materials Article of this Section.

7. If the cylinders show compressive strengths below the minimum acceptable limit, Engineer may require coring of the parent concrete structure at Contractor’s sole cost and expense. Cores shall conform to ASTM C42 and RS Subsection 201-1.1.5.

    a. Coordinate with Test Lab through Engineer to perform additional, earlier cylinder breaks for purposes of scheduling.

8. Submit remediation for not complying with the smoothness requirements to Engineer. If grinding is used it must not reduce the concrete cover on the reinforcing steel to less than 1-1/2 inches.

D. On-Project Site Mock-Ups: Prior to placement, provide On-Project Site mock-ups of the following items:

1. Concrete Work and Finishes:

a. Once samples have been approved, and prior to placement of concrete, provide an on-Project Site mock-up of each concrete finish specified as shown on Drawings, quartered with respective score, control, and expansion joints for approval by Engineer. Locate mock-ups in an accessible and protected place. Concrete mock-ups shall incorporate joints, finishes and sealants at least 14 Calendar Days in advance of construction for approval by Engineer.

b. Engineer shall inform Contractor of approval or rejection of each mock-up. If a mock-up is rejected, Contractor shall provide mock-up for approval by Engineer at no additional cost to Department.

c. Upon request, Engineer may require minor modifications to be made to the mock-ups. The revised mock-ups shall be provided at no additional cost to Department.

d. Once the mock-ups have been approved by Engineer, retain approved mock-ups during construction as standard for judging completed Work.

e. Remove the mock-up(s) from Project Site upon completion of Project.

E. Regulatory Requirements:

1. Sandblasting shall meet South Coast Air Quality Management District (SCAQMD) requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials in a dry and protected location. Protect reinforcing steel and dowels from rusting, deformation, staining, and moisture damage.

B. Store fly ash separately from other components of concrete until concrete is ready to be batched.

C. On-Project Site Mock-Ups: Prior to placement

PART 2 – PRODUCTS

2.1 CONCRETE MIX DESIGN

A. Before beginning any concrete Work, Contractor shall have the concrete mix designed and the ingredients selected and proportioned by an Engineer-approved independent testing laboratory meeting the requirements of ASTM E329 and sited by a State of California registered civil engineer.

B. Mix shall be designed to produce a concrete that has maximum density, minimum shrinkage, and maximum smoothness of surface.

C. Concrete mix designs shall conform to RS Subsection 201-1.1.2 where concrete class is shown on Drawings. Concrete mix design shall conform to RS Subsection 201-1.1.4 where compressive strength is shown on Drawings.

D. Proportion concrete in conformance with ACI SPEC-301, Section 4 - Concrete Mixtures, ACI PRC-211.1, and ACI CODE-318, Chapter 5, Concrete Quality, Mixing and Placing.

2.2 MATERIALS

A. Portland cement concrete shall conform to RS Subsection 201-1 unless shown otherwise on Drawings. Portland cement shall be Type II, low alkali (0.6 percent, maximum), in conformance with ASTM C150/C150M.

1. Only 1 brand of cement shall be used.

B. Ready-mix concrete shall conform to ASTM C94/C94M.

C. Mortar shall conform to RS Subsection 201-5.

D. Reinforcing bars shall be Grade 60 in conformance with ASTM A615/A615M, RS Subsection 201-2, and ACI CODE-318.

1. Exceptions: Reinforcing bars shall be Grade 60 in conformance with ASTM A706/A706M:

a. Where bars are to be welded.

b. As called out on Drawings.

2. Reinforcement Accessories:

    a. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.

    b. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

E. Fiber reinforcement shall be Propex Fibermesh 300. The fibers shall conform to ASTM C1116/C1116M Type III and manufactured specifically for the secondary reinforcement of concrete.

F. Headed steel anchors shall be by Nelson Stud Welders.

G. Aggregate shall be normal weight in conformance with RS Subsection 200-1.4, and shall conform to ASTM C33/C33M, and ACI CODE-318, except where concrete is specified by class on Drawings in conformance with RS Subsection 201-1.1.2, or elsewhere in Specifications.

H. Fine aggregate shall conform to RS Subsection 200-1.5.

I. Non-shrink grout shall conform to ASTM C1107/C1107M and shall be Masterflow 713 as manufactured by Master Builders Solutions, (800) 433-9517. Other non-masonry grouts shall conform to RS Subsection 201-7 and as indicated on Drawings.

    1. Grout for vault grade adjustment shall be high strength, non-shrink grout.

    2. Grout for fence post cores into existing concrete or asphalt concrete shall be non-shrink grout.

J. Chemical admixtures shall conform to RS Subsection 201-1.2.4

    1. Calcium chloride shall not be used.

    2. Strength of concrete with admixture shall be, at 48 hours and more, not less than similar concrete without the admixture.

K. Fly ash shall conform to RS Subsection, 201-1.2.5.3, Class F and ASTM C618.

L. Forms shall conform to RS Subsection 303-1.3 and ACI PRC-347.

    1. Anti-bonding agent shall be Duogard II, as manufactured by W.R. Meadows, (909) 469-2606.

M. Concrete curing shall be by water or membrane curing, Type 1-D, in conformance with RS Subsection 201-4.

N. Sealants for expansion and control joints shall be as specified on Drawings. Joint fillers shall conform to RS Subsection 201-3.2.

O. Epoxy adhesives shall be 2-component, 100 percent solids, 100 percent reactive suitable for use on dry or damp surfaces.

P. Materials shall comply with City of Los Angeles Green Building Code requirements.

1. Enter pertinent product data in VOC Content Verification Checklist form and provide product specification sheets. Make checklist and specifications available to City of Los Angeles Department of Building and Safety inspector through Engineer upon request. VOC Content Verification Checklist form can be found here: https://ladbs.org/docs/default-source/forms/green-building-2023/grn_2_voc_content_verification_checklist-01.17.23.pdf?sfvrsn=19f4c153_10

Q. Slurry material shall be as specified in BASIC SITE MATERIALS AND METHODS Section.

PART 3 – EXECUTION

3.1 PREPARATION

A. Where concrete is to be cast against existing concrete older than 60 days, clean and roughen existing concrete by sandblasting, exposing the aggregate, and apply bonding agent.

3.2 CONSTRUCTION

A. General:

1. Construct exterior concrete equipment pads in conformance with City of Los Angeles Building Code and in conformance RS Subsection 303-1 except for RS Subsections 303-1.11 and 303-1.12.

2. Construct concrete curbs, walks, gutters, cross gutters, access ramps, and driveways in conformance with RS Subsection 303-5 except for RS Subsection 303-5.9.

3. Construct concrete paving in conformance with RS Subsection 302-6 except for RS Subsection 302-6.8. Vehicular traffic closure time period shall conform to RS Subsection 302-6.7 except where Drawings state specific closure time period.

4. Sequence formwork, reinforcement, concrete placement, and other concrete Work in conformance with joint layout and pour sequence approved by Engineer.

B. Formwork:

1. Construct formwork in conformance with RS Subsection 303-1.3.

2. Construct forms that can be removed without hammering or prying against the concrete.

3. Provide plywood sheathing for exposed concrete, whether to be painted or not.

4. Form exposed angles in concrete with neat 3/4 inch 45 degree chamfers and fillets.

5. Remove forms in conformance with RS Subsection 303-1.4.

6. Tolerances for deviation in lines, grades, and dimensions shown on Drawings shall conform to ACI PRC-347.

C. Reinforcement Placing:

1. Place reinforcing bars in conformance with RS Subsection 303-1.7, ACI SPEC-301, ACI CODE-318, and approved shop drawings.

D. Fiber Reinforcement Placing:

1. Place fiber reinforcement in conformance with manufacturer's written instructions.

E. Embedded Materials:

1. Maintain 4/3 times maximum aggregate size clearance from pipes, conduits, and other embeds to reinforcing bars.

2. Place anchor bolts in templates to maintain position during concrete placement.

F. Placing Concrete:

1. Clear water from areas where concrete is to be placed prior to placing concrete.

2. Clean dirt, grease, rust, and the like from metalwork, including steel reinforcement, that shall be in contact with concrete immediately prior to placing concrete.

3. Place concrete in conformance with RS Subsection 303-1.8 and City of Los Angeles Building Code.

   a. Discharge of ready-mix concrete shall be completed within 90 minutes after addition of the cement to the aggregates, or before 300 revolutions of the drum, whichever occurs first.

   b. Use of non-agitating transport equipment for ready-mixed concrete is not permitted.

   c. Maximum length of chutes shall be 50 feet.

4. Consolidation of Concrete:

   a. Consolidate concrete in conformance with RS Subsection 303-1.8.4. Fill corners and angles, thoroughly embed reinforcement, eliminate rock pockets and bring only a slight excess of water to exposed surface of concrete during placement.

   b. Screed to bring the concrete surfaces to required grades with straight edge screed and scrapers as necessary.

   c. Float to compact the surfaces evenly. Remove excess surface water before floating. Do not use mortar to level surfaces.

## 3.3 SLURRY PLACEMENT

A. Cement slurry backfill shall be placed in a uniform manner that shall prevent voids in, or segregation of, the backfill.

## 3.4 CONCRETE FINISH

A. Exterior concrete slabs, ramps, and aprons shall be finished in conformance with RS Subsection 303-5.5.5 and shall have a non-slip light broom finish unless otherwise called for on Drawings.

B. Curbs, gutters, cross gutters, driveways, and walks shall be finished in conformance with RS Subsection 303-5.5 except for Subsection 303-5.9.

C. Finish concrete pavement in conformance with RS Subsection 302-6.4.

D. Finish other exterior concrete structures above and below grade, including high mast light pole foundations, in conformance with RS Subsection 303-1.9.

3.5 JOINTING

A. Refer to ACI 302.1R for Work under this Section.

B. Construction and Contraction Joints:

1. Submit shop drawings of proposed locations of construction and contraction joints for approval by Engineer.

2. Perform jointing with a new diamon tip circular saw.

3. Joint Width: Per Drawings: Do not exceed 3/16 inch in width.

4. Depth of sawcuts: 1/4 depth of slab

5. Decorative Sawcut Joints: Per Drawings.

6. Sawcut joints in a straight line with no overcutting.

7. Use a hand tool to sawcut up to vertical edges such as walls, steps, cutbes, and columns. No cutting into vertical surfaces shall be allowed.

3.6 TREATMENT OF SURFACE DEFECTS

A. Immediately after forms are removed, rub or grind out irregularities.

B. Fill minor voids, holes, honeycombing, tie-rod cone impressions, and other depressions with non-shrink grout. Presence of extensive defects is cause for rejection of concrete.

1. Cut back defective areas a minimum of 1/2 inch depth

2. Wet surfaces prior to applying repair material.

3.7 CURING

A. Cure concrete in conformance with RS Subsection 303-1.10 using water cure where possible, otherwise membrane cure.

3.8 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Department shall provide City of Los Angeles registered deputy building inspector.

3.9 PROTECTION

A. Protect finished concrete surfaces from stains, abrasions, and other damage.

3.10 MAINTENANCE

A. Surfaces exposed to salts, chlorine, and chemicals should be washed daily with potable water.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Architectural cast-in-place concrete

## 1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 07 92 00 - Joint Sealants

C. Section 26 00 01 - Basic Electrical Materials and Methods

D. Section 31 00 00 - Earthwork

E. Section 32 13 14 - Concrete for Exterior Improvements

F. Section 32 31 13 - Chain Link Fences and Gates

G. Section 33 40 01 - Storm Drainage

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Architectural Cast-in-Place Concrete and the Architectural Cast-in-Place Concrete for Parking Lot Areas bid items of Bid Proposal Line Items.

## 1.4 REFERENCES

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary.

B. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide.

C. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction.

D. ACI PRC-347 - Guide to Formwork for Concrete.

E. ACI SPEC-301 - Specifications for Concrete Construction.

F. ANSI A326.3 - American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials.

G. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

H. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.

I. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

J. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.

K. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

L. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

M. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

N. ASTM C88/C88M - Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.

O. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

P. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

Q. ASTM C150/C150M - Standard Specification for Portland Cement.

R. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.

S. ASTM C470/C470M - Standard Specification for Molds for Forming Concrete Test Cylinders Vertically.

T. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.

U. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

V. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

W. ASTM C1116/C1116M - Standard Specification for Fiber-Reinforced Concrete.

X. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

1.5 COORDINATION

A. Notify Engineer and Contractor performing Work related to installation of Contractor's Work in ample time, to allow sufficient time for them to perform their portion of Work.

1.6 SUBMITTALS

A. Product Data: Submit no later than 10 days after Contract Award, a typed list of products specified in this Section.

B. Submit shop drawings for reinforcing steel and accessories in conformance with ACI CODE-318.

C. Paving Jointing and Pour Sequence Plan - Submit indicating the following:

1. Proposed layout of construction, dowel basket, and sawcut joints. Clearly delineate 3 different joint types.

2. Layout of paving types as indicated on Drawings.

3. Statement of Mix Design: Submit 1 copy of Statement of Mix Design prepared by batch plant servicing Project for each load delivered to Project. Statement of Mix Design to contain following information:

a. Name, address, and telephone number of batch plant preparing statement of mix design.

b. Date of mix design.

c. Project location.

d. Contractor requesting load delivery.

e. Mix design number.

f. Integral color used.

g. Gradations for sand and aggregate.

h. Material weights, specific gravity, and absolute volumes.

i. Basis of testing, i.e. UBC 2605 D4 and Title 24 2604 D4.

j. Water/cement ratio.

k. Pounds per square inch (psi) rating.

l. Signature of testing laboratory manager.

m. Signed stamp from registered Project structural engineer.

D. Submit evidence of licensed installer qualifications for experience, demonstration of square footage installed, number of projects, and contact information to verify experience as indicated in Quality Assurance Article of this Section.

E. Craftsmen Specification Aggregate (extra stock):

1. One 1-pound sample of each Craftsmen Specification aggregate specified.

2. One 50-pound sealed bag of each Craftsmen Specification aggregate specified for use by Engineer in future repairs of damaged Craftsmen Specification concrete paving.

F. Washed Concrete Sand (extra stock):

1. One 50-pound sealed bag of washed concrete sand similar to type used during installation of Craftsmen Specification finish.

G. Surface wet dynamic coefficient of friction (DCOF) test results per ANSI A326.3 exceeding 0.55.

H. Reference samples for verification of design intent, approximately 12-inch by 12-inch samples for each type specified, representative of finishes, colors, and textures to match design reference samples as approved by Engineer.

1.7 QUALITY ASSURANCE

A. Quality control to be maintained by a Craftsmen Specification installer throughout duration of Project.

B. Provide evidence to indicate successful experience in providing Craftsmen Specification finishes similar in size and scope.

C. Submit background information and/or qualifications of installer's certified to perform Craftsmen Specification installation. This information shall provide evidence to indicate successful experience in providing concrete Work identical to that specified in this Section. Provide a list of comparable projects for Engineer review and approval. Submittal shall provide Engineer with evidence of successful experience in Craftsmen Specification finishes similar to that specified in this Section and can demonstrate successful experience through past project documentation and references.

D. Demonstration of experience: Provide a minimum of 3 project examples each of installed Craftsmen Specification Surface Seeded Glass, Craftsmen Specification Non-Slip Large Ground Profile, Craftsmen Specification Non-Slip Small Ground Profile, Craftsmen Specification Combined Granite, Craftsmen Specification Pneumatic Spray, Craftsmen Specification Groove Trowel, and Craftsmen Specification Sedimentary Wall architectural cast-in-place concrete with a reference list of each containing address of installation, contact person and phone number of project’s architect or owner’s representation. Minimum size of each individual installation shall be 10,000 square feet. Provide 2 color photos, 8 inch by 10 inch size, of each installation listed above representing the installation. Photo #1 shall show the approximate size of the installation. The second photo shall be taken approximately 2 to 3 feet from the paving service.

E. Supervision: On site superintendent shall have a minimum of 10 years experience installing Craftsmen Specification finishes.

F. Slip Resistance: provide a finish with a slip resistance of equal or greater than 0.55 wet DCOF when tested by in conformance with ANSI A326.3 or equivalent standards capable of field measuring DCOF.

G. Verify conditions at site that affect Work of this Section.

H. Take field measurements as required.

I. Report major discrepancies between Drawings and field dimensions to Engineer prior to commencing Work.

J. A testing agency may be designated by Engineer. Testing personnel must meet ASTM E329 requirements.

K. On-Project Site Mock-Ups:

1. Concrete Work and Finishes:

a. Once samples have been approved, and prior to placement of concrete, provide an on-Project Site mock-up of each concrete finish specified as shown on Drawings.

b. Ensure that each mock-up contains joint types specified on Drawings, including construction, construction, expansion, as well as sealants.

c. Locate mock-ups in a conveniently accessible and protected place. Approved mock-ups shall be standard for future Craftsmen Specification finish installation review.

d. Concrete mock-ups shall incorporate joints, finishes, and sealants at least 14 Calendar Days in advance of construction for approval by Engineer.

e. Engineer shall inform Contractor of approval or rejection of each mock-up. If a mock-up is rejected, Contractor shall provide mock-up for approval by Engineer at no additional cost to Department.

f. Upon request, Engineer may require minor modifications to be made to the mock-ups. The revised mock-ups shall be provided at no additional cost to Department

g. Once the mock-ups have been approved by Engineer, retain approved mock-ups during construction as standard for judging completed Work.

h. Remove the mock-up(s) from Project Site upon completion of Project.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Keep Work area clean, and in a safe and workmanlike condition so that rubbish, waste, and debris do not interfere with Work of other trades.

B. Store materials in a dry and protected location. Protect reinforcing steel and dowels from rusting, deformation, staining, and moisture damage.

C. Store fly ash separately from other components of concrete until concrete is ready to be batched.

D. Aggregates used for Craftsmen Specification shall be kept dry at all times prior to installation.

1.9 WARRANTY

A. Provide an industry standard one year warranty.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland cement shall be Type II, low alkali (0.6 percent, maximum) in conformance with ASTM C150/C150M.

1. Only 1 brand of cement shall be used.

B. Ready-mix concrete shall conform to ASTM C94/C94M.

C. Washed concrete sand shall be clean, hard, and durable washed concrete sand in conformance with ASTM C33/C33M.

1. Use same sand from single source.

D. Coarse aggregate shall be clean, hard, and durable coarse aggregate in conformance with ASTM C33/C33M.

1. Use same aggregate from single source.

E. Water shall be free from deleterious materials such as oils, acids, and organic matter.

F. Curing compound shall be Craftsmen Specification Cure by Shaw & Sons, (949) 642-0660.

G. Integral Concrete Coloring Admixture: Per manufacturer's recommendations.

H. Air entrainment admixtures shall be in conformance with ASTM C260/C260M and shall be Airalon 3000 as manufactured by Chryso https://www.chrysoinc.com/ or MasterAir AE 200 as manufactured by Master Builders Solutions https://master-builders-solutions.com/en-us/.

I. Water reducing admixtures shall be in conformance with ASTM C494/C494M Type A and shall be ZYLA 625 as manufactured by Chryso https://www.chrysoinc.com/ or MasterGlenium as manufactured by Master Builders Solutions https://master-builders-solutions.com/en-us/.

J. Geotextile Fabric: Install Mirafi 500X woven geotextile fabric under base course of concrete paving except in the City right-of-way conditions in conformance with manufacturer’s written instructions.

K. Reinforcing steel shall be in conformance with ASTM A615/A615M, clean and free of rust, dirt, grease, or oils.

1. Reinforcement Accessories:

a. Tie Wire: Annealed, plain cold-drawn steel, minimum 16 gage, 0.0508 inch in conformance with ASTM A1064/A1064M.

L. Polypropylene Fiber Reinforcement shall be SikaFiber-800 Stealth as manufactured by Sika and be 100 percent virgin multifilament polypropylene fibers in conformance with ASTM C1116/C1116M Type III.

M. Refer to JOINT SEALANTS Section for isolation joint construction.

N. Fly ash shall conform to ASTM C618, Class F.

2.2 CONCRETE MIX DESIGN

A. Before beginning any concrete Work, Contractor shall have the concrete mix designed and the ingredients selected and proportioned by an Engineer-approved independent testing laboratory meeting the requirements ofASTM E329 and sited by a State if California registered civil engineer.

B. Mix shall be designed to produce a concrete that has maximum density, minimum shrinkage, and maximum smoothness of surface.

C. Concrete mix designs shall conform to RS Subsection 201-1.1.2 where concrete class is shown on Drawings. Concrete mix design shall conform to RS Subsection 201-1.1.4 where compressive strength is shown on Drawings.

D. Proportion concrete in conformance with ACI SPEC-301.

E. Concrete Mix Criteria (parameters only, actual mix may vary):

1. Slump: 4 inch, with a 1-inch slump differential between successive batches. Obtain approval from Engineer if slump is outside these parameters.

2. Minimum psi rating at 28 days: 3,000.

3. Water/cement ration: 0.5 - 0.57.

4. Admixtures:
    a. Air entrainment is not recommended. Use waterproofing admixture in place of air entrainment for freeze
    b. Shrinkage Reducing: Do not exceed 2 percent by weight of cement.
5. Fly ash: Use only when seeding reactive Craftsmen aggregates such as glass and seashells.
6. Non-Chloride Accelerators: Do not use corrosive accelerators such as calcium chloride.
7. Concrete Delivery: Use of concrete loads exceeding 90 minutes from time of batch plant must be approved by Engineer.
8. Ensure that batch plant guarantees single source supply for cement, sand, and aggregate.

2.3 CRAFTSMEN SPECIFICATION FINISHES

A. Contact specified installer for specified Craftsmen Specification surface-seeded aggregate type, size, color, and distribution percentage.

B. Craftsmen Specification Surface-Seeded Aggregate:
1. Concrete paving surface shall be free of obvious defects. Finishes to match approved design reference samples and as follows.
2. Concrete paving surface finishes shall be as follows with no substitutuion permitted:
    a. CP-50 - Craftsmen Specification finish matching Shaw & Sons design reference sample number 24-380.
        1) 24-380 - Craftsmen Specification Small Material. Color shall be Type II/V Cement with brown integral color.
    b. CP-51, CP-56, and CP-62 - Craftsmen Specification finish matching Shaw & Sons design reference sample number 24-186.
        1) 24-186 - Craftsmen Specification Small Ground Finish. Color shall be Advancement LT Cement with tan integral color.

c. CP-52 - Craftsmen Specification finish matching Shaw & Sons design reference sample number 24-161.

    1) 24-161 - Craftsmen Specification Heat Fractured Glass Surface. Color shall be Advancement LT Cement with tan integral color.r.

d. CP-53 - Craftsmen Specification finish matching Shaw & Sons design reference sample number 24-382.

    1) 24-382 Craftsmen Specification Small Material. Color shall be Advancement LT cement with tan integral color.

e. CP-54 - Craftsmen Specifcation finish matching Shaw & Sons design reference sample number 24-160.

    1) 24-160 - Craftsmen Specification 100% Granite Surface. Color shall be Advancement LT Cement with tan integral color.

f. CP-57 - Craftsmen Specification finish matching Shaw & Sons design reference sample number 21-123.

    1) 21-123 - Craftsmen Specification 100% Granite Surface. Color shall be White Cement with tan integral color.

g. CP-60 - Craftsmen Specification finish matching Shaw & Sons design reference sample number 24-250 and 24-251.

    1) 24-250 - Craftsmen Pneumatic Spray. Color shall be white cement with custom intregral color.

    2) 24-251 - Craftsmen Specification Sediment Wall. Color shall be white cement with custom integral color.

h. CP-61 - Craftsmen Specification finish mathcing Shaw & Sons design reference sample number 24-250.

    1) 24-250 - Craftsmen Pneumatic Spray. Color shall be white cement with custom integral color.

i. CP-63 - Craftsmen Specification finish mathcing Shaw & Sons design reference sample number 24-188.

    1) 24-188 Craftsmen Specification Groove Trowel. Color shall be Advancement LT Cement with tan integral color.

j. CP-70 - Craftsmen Specification finish matching Shaw & Sons design reference sample number 24-161, 24-183, and 24-187 or 24-380.

   1) 24-161 - Craftsmen Specification Heat Fractured . Color shall be Advancement LT Cement with tan integral color.

   2) 24-183 - Craftsmen Pneumatic Spray. Color shall be white cement.

   3) 24-187 - Craftsmen Specification Small Material. Color shall be Advancement LT with a tan integral color.

   4) 24-380 - Craftsmen Specification Small Material. Color shall be Advancement LT with tan integral color.

k. CP-80 - Concrete Paving. Standard gray with medium sandblast finish.

l. CP-81 - Integral color concrete using gray cement base. The mix to be Davis Color 5084 Spanish Gold. Match to adjacent concrete finish.

m. CP-100 - Crafsmen Specification finish matching Shaw & Sons design reference sample number 25-044.

   1) 25-044 - Crafsmen Specification Small Materials, color derived from surface seeded aggregate only.

n. CP-110 - Craftsmen Specification finish matching Shaw & Sons design reference sample number 25-047.

   1) 25-047 - Craftsmen Specification Small Materials, color derived from surface seeded aggregate only.

o. CP-120 - Craftsmen Specification finish matching  Shaw & Sons design reference sample number 25-077.

   1) 25-077 - Craftsmen Specification Combined Aggregate, color derived from surface seeded aggregate only.

p. CP-200 - Craftsmen Specification Pneumatic Spray Finish matching Shaw & Sons design reference sample 24-183. Color shall be white cement.

q. CP-210 - Craftsmen Specification Pneumatic Spray Finish matching Shaw & Sons design reference sample 24-184. Color shall be Type II/V cement.

r. CP-220 - Craftsmen Specification Surface Seeded Glass matching Shaw & Sons design reference sample 25-077. Color shall be Type II/V cement.

s. CP-230 - Craftsmen Specification Pneumatic Spray Finish matching Shaw & Sons design reference sample 25-044. Color shall be Type II/V cement.

t. CP-240 - Craftsmen Specification Pneumaic Spray Finish matching Shaw & Sons design reference sample 25-047. Color shall be Type II/V cement.

3. Concrete Mowstrip finish shall be as follows with no substitution.

a. M-110 - Craftsmen Specification, 24-186 Small Ground Finish. Color shall be advancement LT.

b. M-120 - Standard Gray Concrete.

4. Use same Craftsmen Specification surface-seeded aggregate from same source for each paving type specified throughout entire project.

5. Craftsmen Specification process incorporates use of following products:

a. Craftsmen Specification Conditioner.

b. Craftsmen Specification Etch Retarder. Apply Craftsmen Specification surface retarder to cover entire seeded area.

c. Lithoseal paving sealer.

d. Sealing:

1) Concrete Protector by Prosoco.

C. Use same Craftsmen Specification surface-seeded aggregates from same source for each paving type.

D. Thoroughly screen and wash aggregates prior to seeding into concrete matrix.

## 2.4 CONSTRUCTION JOINT DOWELS

A. Construct Speed Dowel Construction Joints (CJ) at modules no smaller than 20 feet - 0 inches by 20 feet - 0 inches. Wire dowel baskets (DB) may be used in lieu of CJs to facilitate larger pour areas.

B. Dowel schedule to match rebar schedule with a minimum spacing of 18 inches on center.

C. Fiberglas Dowel Bars shall be Glass Fiber Reinforced Polymer (GFRP) Dowel Bars, 5/8 inch as manufactured by Owens Corning at (800) 438-7465.

D. Encase 50 percent of each dowel in a Speed Dowel, as manufactured by Sika Corporation https://usa.sika.com/, plastic sleeve to allow parallel lateral movement of each dowel. Double check fiberglass dowel to Speed Dowel tolerance to ensure snug fit.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Refer to CRUSHED MISCELLANEOUS BASE Section for subgrade preparation.

B. Place a minimum 2-inch layer of graded washed concrete sand compacted to 95 percent relative compaction over subgrade prior to placing concrete.

C. Include waterproofing and drainage board when pouring on structure.

D. Ensure that utilities, including irrigation lines are buried and compacted.

3.2 FORMWORK

A. Construct formwork in conformance with RS Subsection 303-1.3.

B. Tolerances for deviations in lines, grades, and dimensions shown on Drawings shall conform to ACI PRC-347.

C. Do not exceed 20 feet - 0 inches by 20 feet - 0 inches in a formed construction area unless speed dowels and dowel baskets are used.

D. Lumber for formwork shall be new #2 or better grade wood. Do not use used form lumber.

E. Perform form layout with a digital electronic transit for line layout accuracy.

F. Allow forms to remain in place long enough to allow concrete to set properly. Remove forms when appropriate.

## 3.3 CRAFTSMEN SPECIFICATION INSTALLATION

A. Craftsmen Specification is a patented paving process. Installation of Craftsmen Specification finishes must be performed by a licensed Craftsmen Specification installer and installed in conformance with recommended written instructions. Contact Shaw & Sons at (949) 642-0660 for installation.

B. Craftsmen Specification is installed in conformance under U.S. Patents: #6,033,146, #6,016,635, #7,322,722 B2, #7,607,859 B2, #7,670,081 B2, #8,246,269 B2, #8,936,411 B1, #7,614,820, #8,079,775, #8,864,627, #9,580,915 and multiple U.S. Pending Patents, and U.S. Trademark #6,258,433.

C. Finish design shall match Shaw & Sons sample numbers: 24-186, 24-161, 24-382, 24-160, 24-250, 24-251, 24-188, 24-184 and 24-183.

## 3.4 JOINTING

A. Refer to ACI PRC-302.1 for Work under this Section.

B. Construction and Contraction Joints:

1. Submit shop drawings of proposed locations of construction and contraction joints for approval by Engineer.

2. Perform jointing with a new diamond tip circular saw.

3. Joint Width: Per Drawings. Do not exceed 3/16 inch in width.

4. Depth of sawcuts: 1/4 depth of slab.

5. Decorative Sawcut Joints: Per Drawings.

6. Sawcut joints in a straight line with no overcutting (alignment variance shall not deviate more than 1/8 inch in 10 feet - 0 inches).

7. Use a hand tool to sawcut up to vertical edges such as walls, steps, curbs, and columns. No cutting into vertical surfaces shall be allowed.

C. Isolation Joint Caulking:

1. Install isolation joint caulking to be installed in conformance with JOINT SEALANTS Section.

3.5 CURING

A. After Craftsmen Specification finish installation, cure concrete for 7 days without foot traffic and 30 days without vehicular traffic. If a curing compound is required, refer to Materials Article of this Section for curing compounds for use with Craftsmen Specification finishes.

3.6 SEALING

A. Acid wash entire surface after grinding and seal surface of paving using hydrolyzed alkali-silica solution when reactive materials are used. Follow sealer directions when applying this product; sealer must be applied in 3 to 6 coats.

B. Apply specified sealer per manufacturer’s recommendations.

3.7 PROTECTION

A. Protect installed floors with 3/4 inch plywood over upside down dye-free low profile carpet or other heavy covering during construction period to prevent staining, damage, and wear.

B. Prohibit foot and wheel traffic from floors for 7 days and 30 days from vehicular traffic.

3.8 MAINTENANCE

A. Follow Craftsmen Specification Paving Cleaning and sealing care procedures.

B. Surfaces exposed to salts, chlorine, and chemicals shall be washed daily with potable water.

C. Pressure wash at the first sign of calcification or salt build up and reseal with hydrolyzed lithium quartz sealer and a water proofing sealer.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concrete unit pavers

B. Edge restraints

1.2 RELATED SECTIONS

A. Section 32 11 24 - Crushed Miscellaneous Base

B. Section 32 13 14 - Concrete for Exterior Improvements

C. Section 32 13 15 - Architectural Cast-In-Place Concrete

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. For concrete unit pavers, payment for Work of this Section shall be paid under the Concrete Unit Pavers bid item of Bid Proposal Line Items.

2. Unit pavers: By the square foot. Includes preparation of substrate, setting bed, pavers, sand jointing, and finishing.

1.4 REFERENCE

1.5 SUBMITTALS

A. Product Data: Provide characteristics of paver unit, detectable warning pavers, dimensions, and special shapes.

B. Samples: Submit 2 full-sized samples of each paver type, illustrating style, size, color range, and surface texture of units being provided.

C. Manufacturer's data sheets on each product to be used, including preparation instructions, installation methods, storage, handling requirements, and recommendations.

D. Manufacturer's written installation instructions: Indicate substrate requirements and installation methods.

E. Maintenance Materials: Provide the following for Department's use in maintenance of Project.

1. Extra Pavers: Deliver any unused pavers of each color to a facility designated by Engineer for storage. Pavers must be sorted by color, securely wrapped on a pallet, and clearly laveled. The lavel shall include manufacturer, paver type, size, quantity and color.

2. Shop Drawings: Layout drawings of each paved area showing the pattern of pressed pavers and indicate pavers requiring cutting, drainage patterns, drains, and relationship of paving joints. Include details of setting beds, noting materials and their thicknesses, show details at curbs and vertical surfaces.

1.6 QUALITY ASSURANCE

A. Compliance with Regulations: Comply with requirements of state and local building codes and with rules and regulations telating to building accessibility.

B. Qualifications of Manufacturer: Company specializing in manufacture of precast concrete paving units with a minimum of 10 continuous years of documented experience.

C. Qualifications of Subcontractor: Subcontractor shall submit evidence of skill and not less than 5 years of experience in this product type.

D. Pre-installation Conference: As directed by Architect.

E. Precast concrete paving units shall have a compressive strength of 5,000 psi minimum.

1.7 MOCK-UPS

A. Prior to placement, provide On-Project Site mock-ups of Precast Concrete Unit Pavers.

B. Provide an On-Project Site mock-up of unit pave on appropriate base material, joint, filler, and edging material. Installa 3 foot x 10 foot minimum paver area. Mock-up area to be used to determine joint sizes, lines, paying pattern, color(s) and texture of Project. Mock-up are to be the standard from which Work shall be judged. Mock-ups shallbe provided at least 14 Calendar Days in advance of construction fro approval by Engineer.

C. Upon request, Engineer may require minor modifications to be made to the mock-ups. Revised mock-ups shall be provided at no additional cost to Department.

D. Engineer shall inform Contractor of approval or rejection of each mock-up. If a mock-up is rejected, Contractor

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the installation site in manufacturer's original packaging. Packaging shall contain manufacturer's name, customer name, order, identification number, and other related information.

B. Handle and store precast concrete paving units in accordance with manufacturer's recommendations.

1.9 WARRANTY

A. Provide warranty covering precast conrete paving units against defects in material and workmanship for a period of 5 years. Unusual abuse and neglect are expected.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete Unit Pavers shall be Narrow Modular Paver with medium Sandblast, by Stepstone, Inc., (800) 572-9029.

1. Colors: see drawings for locations of colors and color mix types

a. Color Mix 01

1) P-V French Grey (Field Paver - 70 percent)

2) P-VI, CAFE BROWN (ACCENT PAVER - 30 percent)

b. Color Mix 02:

1) P-11, PEBBLE (FIELD PAVER - 50 percent)

2) P-IV, ALMOND (ACCENT PAVER - 25 percent)

3) P-1 CARAMEL (ACCENT PAVER - 25 percent)

2. Finish: Medium sandblast finish

3. Compressive Strength: minimum of 8,000 pounds per square inch (psi)

4. Absorption: 5 percent average, with a maximum of 6 percent

5. Air entrainment: 5 to 7 percent

6. Size: 3 inches by 12 inches by 4 inches

B. Aggregate Fill: Open-graded aggregate for filling voids and joints in open grid paver units, conforming to requirements of ASTM C33/C33M for No. 8 Crushed Stone.

1. Edging: Formed stainless steel, Type 316, as detailed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that substrate is level or to correct gradient, smooth, capable of supporting pavers and imposed loads, and ready to receive Work of this Section.

B. Verify gradients and elevations of substrate are correct.

3.2 PREPARATION

A. Treat soil with herbicide to retard plant growth.

3.3 INSTALLATION OF SOLID PAVER UNITS

A. Installation shall comply with requirements of applicable building codes and state and local jurisdictions.

B. Install Narrow Modular Pavers in a mortar bed in accordance with Specifications defined in the CTMA Handbook for Concrete Tiles, available at https://www.stepstonedealer.com/docs/CTMA-Handbook-for-Concrete-Tiles.pdf. Maintain straight pattern lines.

C. 100 percent paver bonding coverage is recommended, with a minimum acceptable coverage of 95 percent for exterior installations or 80 percent for interior installations. Backbuttering is mandatory to obtain a minimum of 95 percent coverage.

D. Clear any mortar off the face of the pavers immediately. Never leave a 'cement haze' on the concrete paver's surface.

E. Typical joints between the pavers at the top of paving surface shall be roughly 3/16" to 1/4" wide.

F. Place grout between California Architectural Pavers in accordance with Specifications definded in the CTMA Handbook for Concrete Tiles, available at https://www.stepstonedealer.com/docs/CTMA-Handbook-for-Concrete-Tiles.pdf.

G. Narrow Modular Pavers are concrete and the cementitious material in grout will permanently bond to the pavers. Clean any grout off the face of the pavers immediately. Never leave a 'cement haze' on the concrete paver's surface.

H. Place paver units in pattern indicated on Drawings.

I. Cut paver units at edges with masonry saw.

J. Place half units at edge and interruptions. Maintain tight joints.

K. Tamp and level paver units with mechanical vibrator until units are firmly bedded, level, and to correct elevation and gradients. Do not tamp unrestrained edges.

## 3.4 CLEANING

A. Clean paving promptly after installation in conformance with manufacturer's written instructions. Do not use harsh cleaning materials that could damage finish.

## 3.5 PROTECTION

A. Protect installed paving to ensure that, except for normal weathering, paving shall be without damage or deterioration at time of Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concrete wheel stops

1.2 RELATED SECTIONS

A. Section 32 12 17 - Asphalt Concrete Paving

B. Section 32 13 14 - Concrete for Exterior Improvements

C. Section 32 17 23 - Pavement Markings

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Concrete wheel stops shall be paid under the corresponding Lump Sum Construction bid items of Bid Proposal Line Items.

1.4 REFERENCES

A. Reference Specifications (RS):

Section 201 - Concrete, Mortar, and Related Materials

Subsection 201-1 - Portland Cement Concrete

Subsection 201-2 - Reinforcement for Concrete

B. Standard Plan – City of Los Angeles Harbor Department:

H-203-00 - 4’ Truck Wheel Stop

H-204-00 - 4’ Automobile Wheel Stop

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Wheel stops shall be precast reinforced concrete in accordance with Harbor Department Standard Plans H-203-00 (for trucks) and H-204-00 (for automobiles).

1. Concrete shall conform to RS Subsection 201-1, Class 560-C-3250.

2. Reinforcing steel shall be continuous, No. 4, Grade 60, and in conformance with RS Subsection 201-2.

3. Non-shrink grout shall be in conformance with CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Pavement shall be completely cured and dry, free of dirt, loose particles, and other foreign materials.

B. Locate wheel stops as indicated on Drawings.

C. Secure wheel stops on asphalt concrete pavement in accordance with the referenced standard drawings.

D. Recess steel rods and fill holes with non-shrink cement grout. Smoothly trowel to a smooth appearance.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Container yard striping including container striping and highline striping.

B. Pavement markers.

C. Removing existing markings on pavements and curbs prior to installing new markings.

1.2 RELATED SECTIONS

A. Section 32 12 17 - Asphalt Concrete Paving

B. Section 32 13 14 - Concrete for Exterior Improvements

C. Section 32 17 13 - Parking Bumpers

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the corresponding Lump Sum Construction bid items of Bid Proposal Line Items.

1.4 REFERENCES

A. 40 CFR 262 - Standards Applicable to Generators of Hazardous Waste.

B. Reference Specifications (RS):

Section 214 - Traffic Striping, Curb and Pavement Markings, and Pavement Markers

Subsection 214-2 - Test Reports and Certificates of Compliance

Subsection 214-3 - Glass Beads

Subsection 214-4 - Paint for Striping and Markings

Subsection 214-5 - Thermoplastic Material for Traffic Striping and Markings

Subsection 214-6 - Pavement Markers

Subsection 214-7 - Adhesives for Pavement Markers

Section 314 - Traffic Striping, Curb and Pavement Markings, and Pavement Markers

Subsection 314-4 - Application of Traffic Striping and Curb and Pavement Markings

Subsection 314-5 - Pavement Markers

1.5 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

B. Test Reports and Certificates: Submit for each batch of paint and glass beads stating compliance with specified requirements in conformance with RS Subsection 214-2.

C. For pavement marker quantity less than 10,000, Contractor may submit manufacturer's certification that markers and adhesive conform to RS Subsections 214-6 and 214-7.

D. Submit method to remove existing striping and thermoplastic striping material (thermoplastic paint). Include method to recover grindings, paint residue, blast media, and waste water.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.

B. Deliver glass beads in containers suitable for handling and strong enough to prevent loss during shipment accompanied by batch certificate.

C. Store products in manufacturer's unopened packaging until ready for installation.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in conformance with 40 CFR 262 and South Coast Air Quality Management District (SCAQMD) regulations.

1.7 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Line and Zone Marking Paint: Master Painters Institute (MPI) No. 97 Latex Traffic Marking Paint; color(s) as indicated.

1. Container Yards: White, yellow, and red.

B. Paint:

1. Conform to RS Subsection 214-4.2, Rapid Dry White, Yellow, or Black for traffic paint.

2. Blue and red pavement striping and markings shall conform to the requirement for white paint.

3. Conform to RS Subsection 214-5.1 for thermoplastic paint.

C. Reflective Glass Beads: Conform to RS Subsections 214-3 and 214-4.1.

D. Temporary Marking Tape: Preformed, reflective, pressure sensitive adhesive tape in color(s) required; Contractor is responsible for selection of material of sufficient durability as to perform satisfactorily during period for which its use is required.

E. Pavement Markers:

1. Conform to RS Subsection 214-6. Type of marker as shown on Drawings. Adhesive shall conform to RS Subsection 214-7.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas that shall receive markings and verify that substrates have been properly prepared.

B. Correct unsatisfactory conditions prior to proceeding Work.

3.2 PREPARATION

A. Allow new pavement surfaces to cure for a period of not less than 48 hours before application of marking materials. Allow 5 days after slurry seal or sealcoat application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under Project conditions.

C. Clean surfaces thoroughly prior to installation.

1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.

2. Recover and dispose of grindings, paint residue, blast media, and waste water from areas undergoing marking removals.

3. For striping on new concrete pavement, water blast curing compound off of areas to receive markings.

D. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.

E. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.

F. Temporary Pavement Markings: Apply temporary markings of the color(s), width(s) and length(s) as indicated on Drawings or as directed by Engineer.

1. After temporary marking has served its purpose, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that surface to which the marking was applied shall not be damaged.

2. At Contractor's option, temporary marking tape may be used in lieu of temporary painted marking; remove unsatisfactory tape and replace with painted markings at no additional cost to Department.

G. Engineer shall inspect surfaces to be painted after Contractor has laid out pavement markings, and prior to application of paint materials. Correct deficiencies in layout and surface preparation prior to application of paint.

H. Protect existing and adjacent facilities from overspray and spillage.

3.3 EQUIPMENT

A. Equipment shall conform to RS Subsection 314-4.3.4.

3.4 INSTALLATION

A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.

B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees Fahrenheit (F) or more than 95 degrees F.

C. Apply in conformance with manufacturer's written instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.

D. Comply with California Manual on Uniform Traffic Control Devices (California MUTCD) for details not shown on Drawings.

E. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.

F. Apply uniformly painted and reflective pavement markings of color(s), lengths, and widths as indicated on Drawings with true, sharp edges, and ends.

1. Apply paint in 1 coat only markings show. Markings showing light spots shall receive additional coats as directed by Engineer.

2. Wet Film Thickness: 0.015 inch, minimum.

3. Width Tolerance: Plus or minus 1/8 inch.

4. Straightness Tolerance: Plus or minus 1/2 inch in 50 feet.

G. Symbols: Use a suitable template that shall provide a pavement marking with true, sharp edges and ends, of the design and size indicated on Drawings.

H. Apply thermoplastic paint in conformance with RS Subsection 314-4.4 except for RS Subsections 314-4.4.5 and 314-4.4.6.

I. Install pavement markers in conformance with RS Subsection 314-5 except for RS Subsections 314-5.6 and 314-5.7.

3.5 CLEANING

A. Remove paint overspray, drips, and spills from adjacent surfaces by means which shall not damage the surfaces.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Protective surfacing for playground areas

B. Subbase under resilient surfacing

C. Containment curbs

1.2 RELATED SECTIONS

A. Section 11 68 13 - Playground Equipment

B. Section 32 11 24 - Crushed Miscellaneous Base

C. Section 32 13 14 - Concrete for Exterior Improvements

D. Section 33 40 01 - Storm Drainage

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Playground Protective Surfacing bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).

B. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.

C. ASTM E303 - Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester.

D. ASTM F1292 - Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment.

E. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use.

F. CPSC Pub. No. 325 - Public Playground Safety Handbook.

## 1.5 DEFINITIONS

A. Use Zone: The area beneath and immediately adjacent to a play structure or equipment (play event) that is designated for unrestricted circulation around equipment, and on whose surface it is predicted that a user would land when falling from or exiting the equipment.

B. Critical Fall Height: The maximum fall height at which the protective surfacing meets the requirements of ASTM F1292.

C. High Play Activity Area: Areas where the fall height is especially great, such as at swings. A high play activity area is defined only where the protective surfacing of the entire playground area is not designed for the greatest fall height. High play activity areas are defined on Drawings.

D. Fall Height: The vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it as defined by ASTM F1487.

E. Protective Surfacing: Resilient ground surfacing. The characteristics of the protective surfacing are based on the fall height of the playground equipment. Changes in either the surfacing or the fall height, particularly reducing the resilience of the protective surfacing or increasing the fall height, shall reduce safety-related performance.

F. Subbase: A layer under the resilient layer of the protective surfacing but over the subgrade; may be rigid, as in concrete or bituminous, or aggregate.

G. Subgrade: The surface of the ground on which the protective surfacing is installed.

## 1.6 PRE-INSTALLATION MEETING

A. Coordinate with PLAYGROUND EQUIPMENT Section.

B. Convene a meeting 1 week before starting earthwork for playground to discuss coordination between various installers.

1. Require attendance by personnel responsible for grading and installers of playground equipment, protective surfacing, footings, and adjacent work.

2. Include representatives of Contractor.

3. Notify Engineer at least 2 weeks prior to meeting.

## 1.7 SUBMITTALS

A. Product Data: For all manufactured surfacing products, provide manufacturer's product data showing materials of construction, compliance with specified standards, installation procedures, and safety limitations.

1. Include International Play Equipment Manufacturers Association (IPEMA) certifications where required.

B. Shop Drawings: Detailed scale drawings showing locations of existing playground equipment and exposed footings, bases, and anchorage points.

1. Clearly identify footing and base elevations in relation to a fixed survey point on Project Site and to subgrade elevation and depth of protective surfacing, surveyed by land surveyor licensed in the State of California.

2. Show locations of underground utilities, storm-drainage system, and irrigation system.

3. Show locations of related construction such as walkways and roadways, fences, site furnishings, and plantings.

4. Show measured fall height for each playground equipment item, determined in conformance with ASTM F1487.

5. Show Use Zone perimeters, determined in conformance with ASTM F1487.

C. Samples: Provide actual material samples for each color of safety surfacing of size 12" x 12" minimum.

D. Maintenance Data:

1. For manufactured surfacing products, provide manufacturer's recommended maintenance instructions and list of repair products, with address and phone number of source of supply.

2. For loose fill surfacing products, provide detailed re-ordering information to enable Department to match installed material exactly.

E. Manufacturer's Field Report.

## 1.8 QUALITY ASSURANCE

A. Maintain 1 copy of the latest edition of ASTM F1487 and CPSC Pub. No. 325 at Project Site.

B. Manufacturer Qualifications: Company regularly engaged in manufacturing products specified in this section, with not less than 3 years of documented experience.

1. Surfacing installed in minimum 10 sites and been in successful service minimum 5 years.

2. Certificate of Insurance AA rated for minimum 1,000,000 dollars covering both product and general liability.

3. Manufacturer's Representative: Provide name, company name and address, and qualifications.

4. Certification by manufacturer that installer is IPEMA certified.

C. Installer Qualifications: Company certified by manufacturer for training and experience installing the protective surfacing; provide installer's company name and address, and training and experience certificate.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store protective surfacing to Project Site in conformance with manufacturer's written instructions.

B. Store materials proteccted from exposure to harmful environmental conditions and at the minimum temperature of 40 degrees F (4 degrees C) and a maximum temperature of 90 degrees F (32 degrees C).

1.10 WARRANTY

A. Provide minimum 7 year warranty for playground surfacing.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

A. Because the safety of the playground depends on strict conformance to the design criteria, this information is provided for Contractor's information.

1. The protective surfacing constitutes a resilient layer installed over a non-resilient layer, which is installed over the subgrade, with the top of playground equipment footings and anchorage devices covered by full depth of the resilient portion of the protective surfacing.

2. The total depth available for protective surfacing, from surface of subgrade, is indicated on Drawings.

3. The top elevation of the protective surfacing is intended to be flush with adjacent grades.

4. Use Zone: The protective surfacing has been designed to provide acceptable impact attenuation as defined in ASTM F1292 for Critical Height based on each piece of equipment.

5. High Play Activity Area: The protective surfacing has been designed to provide impact acceptable attenuation as defined in ASTM F1292 for Critical Fall Height based on each piece of play equipment.

B. If deviation from specified depth is required, it is Contractor's responsibility to make changes required to maintain specified top elevation and required impact attenuation at no extra cost to the Department; obtain approval prior to proceeding; follow approval request procedure as specified for substitutions.

2.2 MATERIALS

A. Poured-In-Place Membrane Surfacing:

1. SpectraPour Supreme safety playground surfacing system by SpectraTurf, Inc., (800) 875-5788. Address: 555 Promenade Ave. #103, Corona, CA 92879. Email:infor@spectraturf.com, Website: http://www.spectraturf.com.

2. SpectraPour Supreme primer shall be comprise of urethane..

3. SpectraPour Supreme basemat material shall be a blend of 100 percent recycled SBR (styrene butadiene rubber) and urethane. Thickness: As indicated on Drawings. Basemat mix shall be: 16 plus percent urethane (as ratio: 14 percent urethane divided by 86 percent rubber). 14 percent urethane, 86 percent rubber (based on entire rubber and urethane mix).

4. SpectraPour Supreme top surface shall be a blend of Spectra TPV 0.5 to mm granules and aliphatic urethane binder. Top surface thickness: minimum 1/2 inch, maximum 5/8 inch. Top surface mix shall be: 25 percent urethane (ratio: 20 percent urethane divided by 80 percent TPV). 20 percent urethane, 80 percent TPV (based on entire rubber and urethane mix).

5. Colors (Top Surface):

a. Color Mix A: 530A Sandstone Beige, 100 percent.

b. Color Mix B: 5300A Shamrock Green 50 percent, 5318A Sapphire Blue 35 percent, and 5321A Charcoal Grey 15 percent.

c. Color Mix C: 5302A Inferno Red, 100 percent.

d. Color Mix D: 5308A Agave Teal. 100 percent.

e. Color Mix E: 5307A Jet Black, 100 percent.

f. Color Mix F: 5300A Shamrock Green, 100 percent.

g. Color Mix G: 5318A Sapphire Blue 70 percent and 5303A Sandstone Beige 30 percent.

h. Color Mix H: 5318A Sapphire Blue, 100 percent.

i. Color Mix I: 5318A Sapphire Blue 50 percent and 5323A Aquamarine 50 percent.

j. Color Mix J: 5301A Cobalt Blue, 100 percent.

k. Color Mix K: 5303A Sandstone Beige 50 and 5322A Pampus Ivory 50 percent.

l. Color Mix L: 5303A Sandstone Beige 25 percent and 5322 Pampus Ivory 75 percent.

m. Color Mix M: 5305A Ash Gray, 100 percent.

n. Color Mix N: 5321A Charcoal Gray, 100 percent.

o. Color Mix O: 5310A Ivy Green, 100 percent.

p. Color Mix P: 5317A Lime Green, 100 percent.

q. Color Mix Q: 5322A Pampus Ivory, 100 percent.

r. Color Mix R: 5317A Lime Green 70 percent and 5300A Shamrock Green 30 percent.

s. Color Mix S: 5312A Honey Gold 60 percent and 5322A Pampus Ivory 40 percent.

t. Color Mix T: 5300A Shamrock Green 60 percent and Sandstone Beige 40 percent.

6. Dry Static Coefficient of Friction (ASTM D2047): 1.0

7. Wet Static Coefficient of Friction (ASTM D2047): 0.9

8. Dry Skid Resistance (ASTM E303): 89

9. Wet Skid Resistance (ASTM E303): 57

10. Certification: Provide IPEMA certification of ASTM F1292 Critical Fall Height at thickness specified.

11. Accessories: Provide manufacturer's standard containment curbs and tapered transition elements to support surfacing between changes of surface grade.

B. Rigid Subbase: Concrete, as specified in CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Playground equipment installer shall perform playground layout prior to installation of footings; verify correctness of layout before starting Work.

B. Verify that playground equipment and site furnishings and irrigation system located within playground area are complete.

C. Verify location of underground utilities and facilities in the playground area. Damage to underground utilities and facilities shall be repaired at Contractor's sole cost and expense.

D. Verify that subgrades are at proper elevations and that smooth grading is complete.

E. Verify that proper depth of surfacing is marked on base supports of playground equipment.

3.2 PREPARATION

A. Correct subgrade irregularities to ensure that required depth of protective surfacing can be installed, and subgrade elevation is in conformance with manufacturer's requirements.

B. Remove obstructions that would extend into the resilient protective surfacing inside Use Zones.

C. Remove rocks, debris, and other similar items.

D. Install containment curbs with top surface flush with intended elevation of top surface of protective surfacing.

3.3 SUBBASE

A. Install aggregate subbase as indicated on Drawings and in CRUSHED MISCELLANEOUS BASE Section. Compact aggregate to maximum 95 percent, in conformance with ASTM D1557.

B. Install concrete subbase as indicated on Drawings and in CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

C. Install with top surface of subbase no higher than grades and levels indicated and not more than 1/4 inch lower than grades and levels indicated on Drawings.

D. Install in true, even plane, sloped to provide positive drainage.

E. Flatness Tolerance: 1/4 inch in 10 feet, maximum.

F. Cure subbase at least 7 days but not less than required by manufacturer of resilient surfacing.

3.4 RESILIENT SURFACING LAYER

A. Install in conformance with CPSC Pub. No. 325, ASTM F1487, manufacturer's written instructions, and requirements of authorities having jurisdiction.

B. Install proper thickness throughout Use Zone(s).

C. Clean and dry surface of subbase.

D. Poured In Place Surfacing:

1. Mix components mechanically on-site in conformance with manufacturer's written instructions; do not mix by hand.

2. Install seamlessly; ensure complete bond to subbase.

3. Cover footings and foundations and adhere tightly around penetrating elements.

4. Maintain full thickness of resilient layers within Use Zone; cover or abut containment curbs as indicated on drawings; completely cover tapered transition edges.

5. Hand trowel exposed surface to smooth, even finish.

6. Impact Attenuation Layer: Install entire layer in one continuous pour on the same day.

7. Wear Surface: Bond wear surface to substrate with adhesive. Apply adhesive in small quantities so that wear surface can be applied before adhesive dries.

    a. Install surfacing seamlessly. When wear surface is composed of different color patterns, pour surface continuously and seamlessly.

    b. When seams are required due to color change or field conditions, place adjacent wear surface as soon as possible, before initial pour has cured. Coat edge of initial pour with adhesive and apply wear surface mixture immediately.

    c. Add a minimum of 1/16 inch depth to specified surfacing depth to ensure required impact attenuation performance is met.

    d. Install wear surface to cover foundations and adhere tightly around elements penetrating the surface.

## 3.5 FIELD QUALITY CONTROL

A. Obtain the services of the equipment manufacturer's field representative to review the finished installation for compliance with specified requirements and with design criteria to the extent known to Contractor; submit report of field review.

B. Engineer shall inspect playground surfacing after installation to verify that surfacing is of proper type and depth and that playground meets specified design safety and accessibility requirements.

C. Repair or replace rejected work until compliance is achieved.

## 3.6 CLEANING AND PROTECTION

A. Restore adjacent existing areas that have been damaged from the construction.

B. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation. Clean in conformance with manufacturer's written instructions, using cleaning agents as recommended by manufacturer.

C. Clean playground area of excess construction materials, debris, and waste.

D. Remove excess and waste material and dispose of off-site in conformance with requirements of authorities having jurisdiction.

E. Protect installed products until Substantial Completion.

F. Replace damaged products before Substantial Completion.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Chain link fences, gates, and accessories

B. Post footings

C. Filler strips

D. K-rails

E. Structural cantilever slide gate and operator

## 1.2 RELATED SECTIONS

A. Section 05 05 14 - Treating Damaged Galvanizing

B. Section 09 90 01 - Painting for Exterior Improvements

C. Section 32 12 17 - Asphalt Concrete Paving

D. Section 32 13 14 - Concrete for Exterior Improvements

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the corresponding Lump Sum Construction bid items of Bid Proposal Line Items.

## 1.4 REFERENCES

A. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

C. ASTM A90/A90M - Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.

D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

E. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

F. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.

G. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

H. ASTM A824 - Standard Specification for Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link Fence.

I. ASTM F626 - Standard Specification for Fence Fittings.

J. ASTM F668 - Standard Specification for Polyvinyl Chloride (PVC), Polyolefin and Other Polymer-Coated Steel Chain Link Fence Fabric.

K. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.

L. ASTM F1184 - Standard Specification for Industrial and Commercial Horizontal Slide Gates.

M. ASTM F2200 - Standard Specification for Automated Vehicular Gate Construction.

N. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems.

O. State of California Department of Transportation (Caltrans) Standard Plans:

T3 - Temporary Railing (Type K)

1.5 SUBMITTALS

A. Submit shop drawings of typical fence elevations showing line post, corner post, gate post, and gates for review prior to fabrication. Shop drawings shall include pipe sizes, gate sizes, bracing, locking devices, hinges or rollers, tensioning hardware, pipe embedment depths, and galvanizing.

B. Submit fence materials for galvanizing thickness testing. Materials to be tested shall comply with ASTM A90/A90M. Obtain Engineer’s review prior to installation.

C. Structural Cantilever Slide Gate and Operator

1. Product Data

a. Provide manufacturer's catalog cuts with printed specifications and installation instructions.

b. Deliver two copies of operation and maintenance data covering the installed products. Manual to include parts list showing manufacturer's names and part numbers for the gate operator.

c. Submit 3 sets of painted steel for steel park gate.

2. Shop Drawings

a. Supply shop drawings showing the relationship of operating systems with gate components, including details of major components.

b. Include complete details of gate construction, gate height and post spacing dimensions.

3. Certificate of Performance

a. Manufacturer of gate system shall provide certification stating the gate system includes the following material components that provide superior performance and longevity. Alternate designs built to minimum standards that do not include these additional structural features shall not be accepted.

b. Gate track system shall be keyed to interlock into gate frame member (providing 200 percent additional strength when compared to weld only keyless systems). When interlocked with and welded to the "keyed" frame top member, gate track forms a composite structure.

c. Gate shall have a minimum counterbalance length of 50 percent opening width which provides a 36 percent increase in lateral resistance (when compared to ASTM minimum of 40 percent counterbalance). If gate is ever to be automated, counterbalance section shall be filled with fabric or other specified material.

d. To provide superior structural integrity, intermediate vertical members shall be used - with spacing between verticals to be less than 50 percent of the gate frame height.

e. Entire gate frame (including counterbalance section) shall include 2 adjustable stainless or galvanized steel cables (minimum 3/16”) per bay to allow complete gate frame adjustment (maintaining strongest structural square and level orientation).

f. Gate truck assemblies shall be tested for continuous duty and shall have precision ground and hardened components. Bearings shall be pre-lubricated and contain shock resistant outer races and captured seals.

g. Gate truck assemblies shall be supported by a minimum 5/8 inch plated steel bolt with self aligning capability, rated to support a 2,000 lb reaction load.

h. Hanger brackets shall be hot dipped galvanized steel with a minimum 3/8 inch thickness that is also gusseted for additional strength.

i. Gate top track and supporting hangar bracket assemblies shall be certified by a licensed professional engineer to withstand a 2,000 lb. vertical reaction load without exceeding allowable stresses.

j. Gate is to be designed to meet specified ASCE-7 wind load requirements with the gate in the closed and latched condition only. Typical gate design is expected to operate satisfactorily in winds up to 30 MPH. Depending on gate panel infill, winds higher than 30 MPH may cause gate operational problems (if automated, operator entrapment may trigger; gate panel may not engage receiver). For sites with higher operational, non-typical, or specified wind loadings, manufacturer should be advised of the site conditions and a specifically engineered design shall be offered.

4. Certifications

a. Gate in compliance with ASTM F2200, Standard Specification for Automated Vehicular Gate Construction.

b. The gate operator shall be in compliance with UL 325 as evidenced by UL listing label attached to gate operator.

c. Gate manufacturer shall provide independent certification as to the use of a documented Welding Procedure Specification and Procedure Qualification Record to insure conformance to the AWS D1.2 welding code. Upon request, Individual Certificates of Welder Qualification documenting successful completion of the requirements of the AWS D1.2 code shall also be provided.

d. Manufacturer shall supply gate design performance certification.

e. Gate is to be designed to meet specified ASCE-7 wind load requirements with the gate in the closed and latched condition only. Typical gate design is expected to operate satisfactorily in winds up to 30 MPH. Depending on gate panel infill, winds higher than 30 MPH may cause gate operational problems (operator entrapment sensing may trigger; gate panel may not engage receiver). For sites with higher operational, non-typical, or specified wind loadings, manufacturer should be advised of the site conditions and a specifically engineered design shall be offered. See 1.02 E.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:

1. Construct chain link fencing and gates of hot-dipped galvanized materials as specified.

2. Steel materials shall have a minimum galvanized coating of 2 ounces per square foot of surface area, tension wire, clips, ties and hog rings which shall have a Class 3 coating in conformance with ASTM A121, unless otherwise specified.

3. Fencing shall be 8 feet high (vertically).

B. Fabric:

1. Fabric shall conform to ASTM A392, be helically wound and interwoven; 2-inch mesh; 6 gage for fabric 108 inches or more in height; 9 gage for fabric less than 108 inches high; fabric less than 60 inches high shall be knuckled on top. Galvanize material in conformance with ASTM A392, Class 2, zinc coating after weaving (2 ounces per square foot).

2. Furnish fence fabric in 50 foot lengths.

C. Barbed Wire:

1. Barbed wire shall conform to ASTM A121. Wire shall consist of 3 strand pairs of 13 1/2 gage steel line wire with 0.08 inch, 4-point barbs spaced approximately 5 inches apart. Galvanize material in conformance with ASTM A121, Class 3 coating (0.70 ounces per square foot).

D. Tension Wire:

1. Tension wire shall conform to ASTM A824 and shall be 0.177 inch diameter hot-dipped galvanized marcelled steel, Type II, Class 2 zinc coating in conformance with ASTM A824 (2.0 ounces per square foot).

E. Hog Rings:

1. Hog rings shall conform to ASTM F626 and shall be 0.11 inch diameter, hot-dipped galvanized steel, Class 3 or A zinc coating in conformance with ASTM A641/A641M (0.8 ounces per square foot).

F. Wire Fabric Ties:

1. Ties shall conform to ASTM F626 and shall be 0.148 diameter, hot-dipped galvanized steel, zinc coating in conformance with ASTM A641/A641M, Class 3 or A (0.9 ounces per square foot).

G. Flat Band Fabric Ties:

1. Ties shall be 1/2 inch by 0.06 inch, hot-dipped galvanized steel, Class B3 coating in conformance with ASTM A153/A153M (1.3 ounces per square foot).

H. Tension Bars:

1. Tension bars shall conform to ASTM F626 and shall be 3/16 inch by 3/4 inch, high carbon steel, galvanized with 1.2 ounces per square foot coating.

I. Truss Rods:

1. Truss rods shall conform to ASTM F626 and be 3/8 inch, diameter, adjustable, threaded at one end hot-dipped galvanized steel, (1.2 ounces per square foot). Provide galvanized bracket for adjusting tension at threaded end.

J. Turnbuckles:

1. Turnbuckles shall be wrought iron in conformance with ASTM A47/A47M, galvanized drop forged steel, Class A in conformance with ASTM A153/A153M (2 ounces per square foot).

K. Posts and Gate Frames:

1. Posts and gate frames shall be cylindrical, welded at corners (no circumferential welds) or assembled with corner fittings. Gates with corner fitting connections shall have adjustable truss rods for gate panels 5 feet or wider. Pipe shall be hot-dipped galvanized steel conforming to ASTM A53/A53M, Schedule 40, zinc coated (1.8 ounces per square foot) or ASTM F1083, Schedule 40, zinc coated (1.8 ounces per square foot). Gate frames shall be covered with fabric to match fence.

L. Gate Hinges and Accessories:

1. Gate hinges and accessories shall be malleable iron in conformance with ASTM A47/A47M and galvanized in conformance with ASTM A153/A153M, Class A zinc coating (2 ounces per square foot). Hinges shall be structurally capable of supporting the gate leaf and allow the gate to open and close without binding. Hinges shall be designed to permit the gate to swing a full 180 degrees.

M. Latch Hardware:

1. Latches are required for double gates. Latch hardware shall be galvanized malleable iron in conformance with ASTM A47/A47M. Plunger bars may be tubular or bar steel and shall be capable of retaining the gate in a closed position. Latches shall have provisions for a padlock. Galvanize in conformance with ASTM A153/A153M, Class A (2 ounces per square foot).

N. Tension Bands:

1. Tension bands shall be steel and shall conform to ASTM F626, 1/8 inch by 1 inch with beveled edges, and hot-dipped galvanized (1.2 ounces per square foot).

O. Bolts:

1. Bolts shall be steel ASTM A307 with hot-dipped galvanized zinc coating in conformance with ASTM A153/A153M, Class C (1.25 ounces per square foot).

P. Nuts:

1. Nuts shall be steel ASTM A307 with hot-dipped galvanized zinc coating in conformance with ASTM A153/A153M, Class C (1.25 ounces per square foot).

Q. Sleeves:

1. Sleeves shall be 1.695-inch I.D. by 0.078-inch wall, drawn tube, 6 inches long. Sleeve shall be self centering type in conformance with ASTM A53/A53M; galvanized (1.8 ounces per square foot).

R. Top Rails and Brace Rails:

1. Rails shall be 1 1/4-inch American Standard Schedule 40 galvanized steel pipe in conformance with ASTM A53/A53M; hot-dipped galvanized (1.8 ounces per square foot).

S. Rail, Brace Ends, and Post Caps:

1. Rail, brace ends, and posts caps shall be permanent mold casting, sand casting, galvanized malleable iron in conformance with ASTM A47/A47M and galvanized in conformance with ASTM A153/A153M, Class A (2 ounces per square foot).

T. Post Tops:

1. Post tops shall be permanent mold, sand mold, die castings, malleable iron in conformance with ASTM A47/A47M and galvanized in conformance with ASTM A153/A153M, Class A (2 ounces per square foot). Tops shall be weather tight closure caps, 1 for each post.

U. Barbed Wire Supporting Arm:

1. Barbed wire supporting arms shall be 16 gage steel in conformance with ASTM F626 and with the arm at 45 degrees. The top wire of the 3 wires shall be 12 inches horizontally from the fence line and the other wires spaced uniformly between top of fence fabric and the outside strand. The vertical distance between the top wire and the height of the top of fence fabric shall be 12 inches.

V. Filler Strips (Slats):

1. Fabricate filler strips from durable, semi-rigid fiberglass reinforced plastic composed of fiberglass reinforcements, high quality polyester resins, pigments, and fillers. “Dura Slatts” as manufactured by FRP Systems, Supplier: Lady Fencer (770) 288-3330. For 9 gage 2 inch mesh fabric, width shall be 1 inch to 1-3/4 inch.

2. Physical Properties: Not less than: 12,000 pounds per square inch (psi) flexural strength, 1.0 by 106 psi flexural modulus, 8,000 psi tensile strength, 1.0 by 106 psi tensile modulus, and 2,000 psi compression strength. Flame spread: less than 200. Ignition point: 750 degrees to 800 degrees Fahrenheit (F).

3. Color: As selected by Engineer or as indicated on Drawings.

W. Windscreen: Polypropylene or high density polyethylene open mesh woven windscreen with finished edges and grommets. 80 percent blockage, color green or as selected by Engineer. Supplier: The Park Catalog (888) 447-2401.

X. K-rails:

1. K-rails shall be in accordance with State of California Department of Transportation (Caltrans) Standard Plans Plan No. T3A modified with scuppers.

Y. Park Gate:

1. Custom Galvanized Steel Gate painted in safety yellow per Drawings.

2.2 PVC COATED FENCE

A. PVC coating for fabric and tension wire shall conform to ASTM F668, class 2b, black, unless noted otherwise on Drawings.

B. Fabric:

1. Fabric shall conform to specification for non-PVC / powder coated fabric.

a. Wire shall be galvanized to a coating thickness of 2 ounces per square foot and given a Class 2b PVC coating prior to weaving.

C. PVC coated tension wire shall conform to the same requirements as non-PVC coated material.

D. The remaining metallic fence materials, except threaded items, shall conform to Specifications for non-PVC coated materials and shall have a 3 mil thick powder coat of the same color as the fabric.

E. Threaded items shall conform to Specifications for non-PVC coated items.

2.3 CONCRETE FOR SETTING POSTS

A. Concrete for setting posts shall be in conformance with CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

2.4 SIZES FOR POSTS, RAILS, BRACES, AND GATE FRAMES

| | Use | Nominal Pipe Size* O.D. (Inches) | Actual O.D. (Inches) | Weight per Lbs/ft (Galv. Steel) |
|---|---|---|---|---|
| | | | | |
| A. | End, corner, slope, and rolling gate posts for fences 6 feet or higher | 3 | 2.875 | 5.79 |
| | | | | |
| B. | End, corner, slope, and rolling gate posts, fences less than 6 feet | 2-1/2 | 2.375 | 3.65 |
| | | | | |
| C. | Line posts for fences 6 feet or higher | 2-1/2 | 2.375 | 3.65 |
| | | | | |
| D. | Line posts for fences less than 6 feet high | 2 | 1.90 | 2.72 |
| | | | | |

| | Use | Nominal Pipe Size* O.D. (Inches) | Actual O.D. (Inches) | Weight per Lbs/ft (Galv. Steel) |
|---|---|---|---|---|
| E. | Top rail and braces | 1-5/8 | 1.66 | 2.27 |
| | | | | |
| F. | Swinging gate post for 3 feet, and 6 feet single or 12 feet double gates, 6 feet or higher;<br><br>Under 72 inches | 3<br><br>2-1/2 | 2.875<br><br>2.375 | 5.79<br><br>3.65 |
| | | | | |
| G. | Swinging gate posts for single gates from 6 feet to 13 feet and double gates over 12 feet but not over 26 feet | 4 | 4.00 | 9.12 |
| | | | | |
| H. | Swinging gate posts for single gates 13 to 18 feet and double gates 26 to 36 feet | 6-5/8 | 6.625 | 18.99 |
| | | | | |
| I. | Swinging gate posts over 18 feet single and 36 feet double | 8-5/8 | 8.625 | 28.58 |
| | | | | |
| J. | Gate leaf 6 feet in width, frames and bracing | 1-5/8 | 1.66 | 2.27 |
| | | | | |
| K. | Gates leaf greater than 6 feet in width Frame--- | 2 | 1.90 | 2.72 |
| | | | | |

| | Use | Nominal Pipe Size* O.D. (Inches) | Actual O.D. (Inches) | Weight per Lbs/ft (Galv. Steel) |
|---|---|---|---|---|
| | Vertical Divisions--- | 2 | 1.90 | 2.72 |
| | | | | |
| | Bracing--- | 1-5/8 | 1.66 | 2.27 |
| | | | | |
| *Fence Industry Standard O.D. | | | | |

2.5 STRUCTURAL CANTILEVER SLIDE GATE AND OPERATOR

A. The cantilever sliding gate system and operator, TYM-SL-4000DC Heavy Duty Gate Systems, shall be manufactured by Tymetal Corporation or approved substitution. Substitution systems must be submitted to Engineer for approval.

B. Gate Width:

1. Heavy Duty Gate may be used for clear openings up to 30’ wide.

C. Heavy Duty Gate Frame

1. The gate frame shall be fabricated from 6063-T6 aluminum alloy extrusions. The top member shall be a 3" by 5" aluminum structural channel/tube extrusion weighing not less than 3.0 lb/lf (4.4kg/m). To maintain structural integrity this frame member shall be "keyed" to interlock with the “keyed” track member. If fabricated as a single horizontal piece, the bottom member shall be a 2" by 5" aluminum structural tube weighing not less than 2.0 lb/lf (2.9kg/m). If fabricated in two horizontal pieces, the bottom member shall be a 5 inch aluminum structural channel weighing not less than 2.6 lb/lf (3.8kg/m). When the gate frame is manufactured in two horizontal pieces or sections, they shall be spliced in the field (the gate frame shall be fabricated in one or multiple sections depending on size requirements or project constraints).

2. The vertical members at the ends of the gate frame shall be “P” shaped in cross section with a nominal base dimension of no less than 2” by 2” and weighing not less than 1.6 lb/lf (2.3kg/m). Major 2” by 2” vertical members weighing not less than 1.1 lb/lf shall separate each bay and shall be spaced at less than gate height intervals.

3. Intermediate 1” by 2” vertical members weighing not less than .82 lb/lf shall alternate between 2” by 2” major members.

D. Gate Track

1. The gate frame shall have a separate semi-enclosed “keyed” track, extruded from 6005A-T61 or 6105-T5 aluminum alloy, weighing not less than 2.9 lb/lf (4.2kg/m). The track member is to be located on only one side of the top primary. Welds to be placed alternately along the top and side of the track at 9 inch centers with welds being a minimum of 2 inch.

2. Welds on the gate frame shall conform to Welding Procedure Specification and Procedure Qualification Record to insure conformance to the AWS D1.2 Structural Welding Code. Individual welders shall be certified to AWS D1.2 welding code.

E. Gate Mounting

1. The gate frame is to be supported from the track by 2 swivel type, self-aligning, 4 wheeled, sealed lubricant, ball-bearing truck assemblies.

2. The bottom of each support post shall have a bracket equipped with a pair of 3 inch UHMW guide wheels Wheel cover protectors shall be included with bottom guides to comply with UL 325.

3. Gap protectors shall be provided and installed, compliant with ASTM F2200.

F. Diagonal Bracing

1. Diagonal "X" bracing of 1/4 inch diameter stainless or galvanized steel cable shall be installed throughout the entire gate frame.

G. Chain Link Fabric

1. The gate shall be completed by installation of approved filler as specified. Chain link 2” by 2” by 9 gauge aluminized steel chain link fabric shall extend the entire length of the gate (if operated gate, counterbalance must also have fabric to prevent reach through and comply with ASTM F2200, see 1.03 C.1) Fabric shall be attached at each end of the gate frame by standard fence industry tension bars and tied at each 2” by 2” vertical member with standard fence industry ties. ASTM F2200 requires attachment method that leaves no leading or bottom edge protrusions (cannot exceed 0.5 inch).

H. Finish

1. Gate to be mill finish aluminum or color coated with polyester powder as specified. If powder coated, the gate (including track member) and accessories shall be pretreated chemically by sand blasting or other acceptable method to ensure proper coating adherence.

I. Gate Operator

1. UL 325 and UL991 compliant.
2. The gate operator shall be rated to operate a gate weighing up to 4000 lbs.
3. Maximum gate opening length: 60 feet.
4. Gate Speed: 12 inches per second.
5. Motor: 1 HP – continuous duty cycle.
6. Power: 220 VAC Single Phase.
7. Gear box ratio 30:1 with internal clutch.
8. Cover: Steel, split open feature.
9. Dimensions: 15 inch wide by 9.5 inch long by 25 inch high.
10. Emergency Release: Mechanical foot pedal.
11. Integrated full time battery back up.
12. Battery: Two 8Ah batteries 12 VDC.
13. Solar Capabilities: 12 VDC or 24 VDC solar panel input

14. Supplied with #40 chain – Coated with “Armor Coat” corrosive resistant chain coating. Corrosive resistance exceeds nickel plating.

15. Photoelectric through beams/photo eyes shall be installed to span the clear opening and gate path at the tail section.

16. Control devices include pushbottons, radio controls, keypads, card readers, key switches, telephone entry systems, and revenue control equipment.

17. Manufacturer shall test each operator at factory to assure smooth, quiet operation.

18. Manufacturer shall test control inputs to ensure proper function.

PART 3 - EXECUTION

3.1 FENCE CONSTRUCTION AND INSTALLATION

A. Post Spacing:

1. Space line posts equidistant on a maximum of 10 feet on center. Posts shall be plumb and the tops of the posts aligned.

B. Post Footings:

1. Post holes shall be cylindrically shaped, sized, and set to the depths shown in the following tabulation except for line posts in asphalt pavement or if shown otherwise on Drawings:

| Post Type | Post Hole Depth | Post Hole Diameter | Post Embedment |
|---|---|---|---|
| | | | |
| Line | 36 inches | 8 inches | 30 inches |
| | | | |
| Terminal and Corner | 42 inches | 12 inches | 36 inches |
| | | | |
| Gate | 42 inches | 18 inches* | 36 inches |
| | | | |
| *or 3-1/2 times pipe diameter (O.D.) whichever is larger | | | |

2. Fill post holes with concrete with top of concrete shaped to drain away from post. Concrete shall extend at least 3 inches below end of post.

C. Line Posts in Asphalt Concrete Pavement:

1. Line post holes in asphalt pavement shall be cored to a diameter no greater than 1/2 inch larger than outside diameter of post. Posts shall then be driven into ground to a 30 inch depth and plumbed true with wood wedges. Backfill remaining void with fine dry sand.

D. Top Rail:

1. Top rails shall pass through the base of the extension arms and shall form a continuous brace from end to end of each stretch of fence. Top rail lengths shall be jointed with sleeves. Fasten top rail to terminal posts by means of rail ends and brace bands.

E. Horizontal Braces:

1. Provide horizontal braces at terminal posts midway between top rail and tension wire. Fasten braces to the line post by brace ends and brace bands, and to the terminal posts by rail ends and brace bands.

F. Diagonal Braces:

1. Install diagonal brace rods from the brace end on the line post back to the terminal post and fastened to it by a brace band. Securely fasten diagonal braces to the terminal post with brace ends and brace bands at the 2/3 point above adjacent grade (where top rails omitted) and attach other end to the adjacent line post at grade. There shall be no more than a 50 degree angle between the brace and the ground.

G. Fence Fabric:

1. Furnish fence fabric in 50-foot continuous lengths. The fabric may be either right-hand or left-hand weave, but not both. Install fabric 2 inches above ground level and fasten line post ties at a maximum of 24 inch intervals. Tighten fabric to provide a smooth uniform appearance. Install tension bars at end posts and gate posts. Install tension bands at a maximum of 15 inch intervals.

H. Tension Wire:

1. Stretch marcelled tension wire from post to post of each stretch of fence, at bottom. Attach tension wire to bottom of the chain link fabric by hog ring-type fasteners at 24 inch on center, maximum. Fasten wire within the bottom 6 inches of the fence fabric. Tension wire shall be taut and free of sag. Attach to terminal posts by means of brace bands.

3.2 GATE CONSTRUCTION AND INSTALLATION

A. Provide each gate leaf over 8 feet in width with vertical stay members.

B. Brace each panel of the gates wider than 5 feet and containing corner fittings by means of 2 diagonal truss rods. Provide tension adjustment nut for tightening threaded rod end against bracket.

C. Do not fabricate gate leaves prior to Engineer’s review of detailed shop drawings. Gate corners and tee junctions shall be connected with electrically welded butt joints; welds shall be sound and watertight. Fit gate with the same type of fabric as the fence.

D. Perform galvanizing after welding.

E. Furnish fittings, including hinges and latches for each gate. One keeper or other device for holding gate open shall be furnished with each leaf 6 feet or wider. One drop bar locking assembly shall be furnished on double gates. Single gates shall have fork latch with provisions for padlock. Locking and catch fittings shall be furnished on double gates.

F. Install gates plumb to operate with freedom through an arc of a minimum 180 degrees.

G. Equip swinging gates 8 feet or greater in width with double carriage wheels at the free swinging end. Carriage wheels shall be at least 8-inches in diameter with solid rubber tires and mounted in a tubular frame at the bottom of the gate.

3.3 BOLTED CONNECTIONS

A. Bolted connections shall be peened, double bolted, or secured by cotter pins to prevent nuts from working loose.

3.4 DAMAGED GALVANIZING

A. Repair damaged galvanizing on the materials in conformance with TREATING DAMAGED GALVANIZING Section.

3.5 CHAIN LINK FENCE WITH K-RAIL

A. Chain link fence with k-rail shall be constructed and installed as indicated on Drawings.

B. Paint k-rails in conformance with PAINTING FOR EXTERIOR IMPROVEMENTS Section.

3.6 CANTILEVER SLIDE GATE

A. Site Inspection

1. Examine final grades and installation conditions.

2. Do not begin Work until unsatisfactory conditions are corrected.

B. Installation

1. Install equipment of this section in strict accordance with the company's printed instructions unless otherwise shown on Contract Drawings.

2. The gate and installation shall conform to ASTM F1184 standards for aluminum cantilever slide gates, Type II, Class 2.

3. The gate system is to comply with ASTM F2200 and UL 325.

4. Obstruction Sensing Systems:

a. The inherent motor current sensors are part of the gate operator system and may not be removed or bypassed.

b. The installing contractor shall be responsible to ensure that appropriate external secondary entrapment protection devices be installed for the specific Project Site conditions to protect against potential entrapment zones. Proper operation of these safety devices shall be verified and training as to the operation and maintenance of these devices for the users and owners shall be documented.

5. System Acceptance and Validation

    a. Acceptance Test:

        1) Test each system function.

        2) Supply equipment necessary for system adjustment and testing.

    b. Test and Explain Safety Features:

        1) Each system feature and device are a separate component of the gate system.

        2) Read and follow instructions for each component.

        3) Ensure that instructions for mechanical components, safety devices and the gate operator are available for everyone who shall be using the gate system.

        4) The warning signs shipped with the gate operator must be installed in prominent position on both sides of the gate.

    c. System Validation:

        1) The complete system shall be adjusted to assure it is performing properly.

        2) The system shall be operated for a sufficient period of time to determine that the system is in proper working order.

        3) Ensure the owner is clear with regard to the safety points concerning the basic operational guidelines of the safety features of the gate operator system. These safety points are listed in the operator manual and must be read prior to system use.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Decorative fences, gates, and accessories

1.2 RELATED SECTIONS

A. Section 31 00 00 - Earthwork

B. Section 32 13 14 - Concrete for Exterior Improvements

C. Section 32 31 13 - Chain Link Fences and Gates

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the corresponding Lump Sum Construction bid items of Bid Proposal Line Items.

1.4 SUBMITTALS

A. Submit manufacturer's literature and samples prior to fabrication.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt at Project Site, materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism, and theft.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. LEGI/OuterSpace Landscape Furnishings, Model LEGI-R 2680 mm fence, swing or rolling gates, (800) 338-2499.

2.2 FENCE MATERIALS

A. The material for fence framework shall be high-tensile steel, double drawn wire, and rod.

B. Mesh: Vertical wire to be 0.24 inch diameter, double horizontal wire rod 0.31 inch diameter, welded. Mesh openings shall be 1.9 inches by 7.9 inches. Vertical wires shall project 1.2 inches above top rail or below bottom rail. Mesh shall be 100 inches wide by 106 inches high, in 2 sections.

C. Single- or Double-Deflector Posts: Consists of rectangular tube 3.1 inches by 1.6 inches with welded top plate 1.6 inches by 3.5 inches and backing plate wide by length of mesh. Deflected portion of post shall be 7.9 inches, 15.8 inches, or 24 inches and infilled with 1.9 inches by 7.9 inches mesh. Overall post length shall be 134 inches. Interior threaded insert to receive bolts to be every 7.9 inches inside post.

D. Bolts: Consists of stainless steel one-way vandal resistant Type V2A stainless steel bolts 3.1 inches diameter by 1.8 inches long.

E. Fabric and Post Assembly: Posts shall be spaced at 98.4 inches on center. Mesh ends to be overlapped behind post with minimum 1.2 inches contact area. Bolts to be passed through backing plate and mesh ends into threaded inserts, frictionally locking mesh and post. Mesh ends for overlapping shall be 2.8 inches by 7.9 inches, so that it shall be possible to correct up to 0.8 inch at both ends for tolerance in post spacing.

F. Corrosion Protection: Material, unless otherwise indicated on Drawings, shall be hot-dip galvanized after fabrication with minimum zinc layer of 1.8 ounces per square foot (oz./sq. ft.), stainless steel sandblasted for optimum coating adhesion, and polyester powdercoated in non-lead, UV stable, thermally set RAL Tiger Drylac powder paints.

G. Color: The color shall be Forest Green (RAL 6005), Winter White (RAL 9010), Stone Grey (RAL 7023), or Jet Black (RAL 9005).

2.3 SWING GATE MATERIAL

A. Steel Gate Post: Consists of rectangular tube 5.5 inches by 5.5 inches 0.2 inch wall or larger with welded, non-projecting head plate, foot plate, and gate wing mounting bracket. Where gate post abuts fence, gate post shall have welded 1.8 inches by 1.2 inches by 0.1 inch wall and 1.6 inches by 1 inch wall X mesh length, clamping strips to accept and hold mesh, using 0.5 inch V2A stainless steel bolts spaced every 16 inches.

B. Gate Wings: Frames shall be welded rectangular steel tube 3.9 inches by 2.4 inches by 0.1 inch wall or larger to be infilled with mesh to match fence. Mounting bolts shall be adjustable, non-projecting and located inside. Ground bolt shall nest safely inside frame when not in use.

C. Mesh: Consists of high tensile, double-drawn steel wire and rod. Vertical wire shall be 0.24 inch diameter, double horizontal wire rod 0.31 inch diameter, welded. Mesh openings shall be 1.9 inches by 7.9 inches.

D. Corrosion Protection: Material, unless otherwise indicated on Drawings, shall be hot-dip galvanized after fabrication with minimum zinc layer of 1.8 oz./sq. ft., stainless steel sandblasted for optimum coating adhesion, polyester powdercoated in non-lead, UV stable, thermally set RAL Tiger powder paints.

E. Color: Color shall be Forest Green (RAL 6005), Winter White (RAL 9010), Stone Grey (RAL 7023), or Jet Black (RAL 9005).

2.4 ROLLING GATE MATERIAL

A. Steel Gate Post: Consists of rectangular tube 3.9 inches by 3.9 inches by 0.2 inch wall or larger with welded, non-projecting head plate, foot plate.

B. Gate Leaf: Frame shall be welded rectangular steel tube 3.9 inches by 3.9 inches by 0.1 inch wall or larger to be infilled with mesh to match fence.

C. Mesh: As specified in Swing Gate Material Article of this Section.

D. Corrosion Protection: As specified in Swing Gate Material Article of this Section.

E. Color: As specified in Swing Gate Material Article of this Section.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fence in accordance with Drawings and manufacturer's written instructions.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Irrigation system and related components

## 1.2 RELATED SECTIONS

A. Section 32 01 91 - Plant Establishment, Maintenance, and Site Care

B. Section 32 13 14 - Concrete for Exterior Improvements

C. Section 32 90 01 - Planting and Landscaping

D. Section 32 91 01 - Planting Soil and Preparation

E. Section 32 93 53 - Palm Trees

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Planting and Irrigation System bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

B. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

C. ASTM D2219 - Standard Specification for Poly(Vinyl Chloride) Insulation for Wire and Cable, 60 °C Operation.

D. ASTM D2220 - Standard Specification for Poly(Vinyl Chloride) Insulation for Wire and Cable, 75 °C Operation.

E. ASTM D2565 - Standard Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications.

F. ASTM D2774 - Standard Practice for Underground Installation of Thermoplastic Pressure Piping.

G. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets.

H. California Health Laws Related to Recycled Water “The Purple Book”:

Excerpts from the Health and Safety Code, Water Code, and Titles 22 and 17 of the California Code of Regulations – June 2001

I. City of Los Angeles Plumbing Code

J. Council of Tree and Landscape Appraisers:

Guide for Establishing Values of Tree and Other Plants

Guide for Plant Appraisal, 9th Edition

Manual for Plant Appraisers Handbook

K. County of Los Angeles Department of Public Health Services:

Guidelines for Pipeline Construction and Installation – For the Safe Use of Recycled/Reclaimed Wastewater

Recycled Water Urban Irrigation User’s Manual, Los Angeles County Recycled Water Advisory Committee, February, 2005

L. Reference Specifications (RS):

Subsection 201-1 - Portland Cement Concrete

M. Standard Plans - City of Los Angeles Department of Public Works, Bureau of Engineering:

S-651-0 - Thrust Blocks for Plastic Pipe Line:

1. Modify note No. 2 to read 420-C-2000 in lieu of 470-B-2000.

1.5 SUBMITTALS

A. Make submittals no later than 30 Calendar Days prior to start of Work of this Section.

B. Submit complete lists of irrigation materials and equipment for approval by Engineer; include manufacturer's name and address, specific trade names, catalog numbers complete with illustrations, and necessary descriptive literature and clearly mark or underline proposed items.

1. Approval of an item, alternate, or substitute indicates only that the product or products appear to meet the requirements of Drawings and Specification on the basis of the information or samples submitted.

C. Disapprovals: Promptly resubmit for approval necessary data concerning a substitution for a disapproved item.

D. Procurement List: Use the approved list of irrigation materials and equipment for procurement without deviation unless otherwise authorized in writing by Engineer.

E. Record Drawings: Accurately dimension from 2 permanent points, locations, including depths of point of connections, piping, valves, control equipment and other related equipment, as directed by Engineer, as installed. Complete and deliver Project Record Drawings in conformance with PROJECT RECORD DOCUMENTS Section.

F. Operations and Maintenance Manuals:

1. Prepare and deliver to Engineer within 10 Calendar Days prior to completion of construction, 3 hard cover 3-ring binders (submit also in electronic file) containing the following information:

a. Index sheet stating Contractor's address and telephone number, list of equipment with name and addresses of local manufacturer's representatives.

b. Catalog and parts sheets on every material and equipment installed under Contract.

c. Warranty statements on equipment.

d. Complete operating and maintenance instruction on equipment furnished.

2. In addition to the above-mentioned maintenance manuals, provide Department's maintenance personnel, through Engineer, with instructions for major equipment.

3. Provide Department with a reduced legible copy of "As-Installed" Irrigation Plan hermetically sealed in a plastic cover to be affixed to the inside of each controller cover.

G. Equipment to be furnished:

1. Supply the following tools to Department:

a. 2 sets of special tools required for removing, disassembling, and adjusting each type of sprinkler and valve supplied.

b. Two 5 foot valve keys for operation of shut-off valve.

c. 2 keys for each for automatic controller and cabinet.

d. 2 quick coupler keys and matching hose swivels for each quick coupling valve.

e. 1 valve box cover key or wrench

f. 6 extra sprinkler heads of each size and type

1.6 EXISTING UTILITIES AND PLANT MATERIALS

A. Exercise care in excavating and working near existing utilities. Contractor shall be responsible for damages to utilities which are caused by Contractor’s operations or neglect. Check existing utilities drawings for existing utility locations. Reference drawings are available for information and substructures purposes at Engineer's Office located at 425 S. Palos Verdes Street, San Pedro, CA (310) 732-3522.

B. Protect in place utilities and plant materials not designated for removal or modification against damage resulting from Work of Contract.

C. Repair or replace existing improvements not designated for removal, which are damaged or removed as a result of Contractor’s operations. When a portion of a sprinkler system must be removed, the remaining lines shall be capped. Repairs and replacements shall be at least equal to existing improvements, and shall match existing improvements in finish and dimension.

D. Existing trees, lawns, and shrubbery that are not to be removed shall be protected from damage or injury. If damaged or removed because of Contractor's operations, they shall be restored or replaced in conformance with PLANTING AND LANDSCAPING Section.

E. When existing planted area are regraded, or removed and replaced because of Contractor's operations, the soil in these areas shall be adequately prepared and replanted in kind. Refer to PLANTING AND LANDSCAPING Section for requirements.

F. Notify tenants or owners of adjacent property 14 Calendar Days to allow tenants or owners to salvage or relocate plants, trees, fences, sprinklers, and other improvements within the right-of-way which are designated for removal and would be destroyed because of Work.

G. Costs for protecting, removing, and restoring existing improvements shall be included in Contractor’s bid.

1.7 VERIFICATION OF DIMENSIONS AND QUANTITIES

A. Verify scaled dimensions and quantities prior to start of Work of this Section.

B. Notify Engineer of discrepancies between Drawings and Specifications and actual Project Site conditions that would affect the execution of the irrigation Work. Do not Work in areas where discrepancies occur until instructed by Engineer.

1.8 MODIFICATION OF CONTRACT DRAWINGS

A. In each case where proposed substitute materials or equipment shall require changes to the design of Project as indicated on Drawings, proposed revision drawings prepared by a State of California licensed landscape architect, certified irrigation designer, or engineer shall be furnished by Contractor for installation of the proposed substitute materials or equipment and for construction by affected trades of the proposed revisions.

B. Cost of Drawings and of the proposed revised construction shall be at sole cost and expense of Contractor.

1.9 INTENT OF DRAWINGS

A. Due to the scale of Drawings, it is not possible to indicate offsets, fittings, and sleeves, which may be required. Contractor shall investigate the finished conditions affecting Work and furnish fittings and other items required to provide a complete irrigation system. Drawings schematically show Work to be installed.

1.10 WATER AND POWER SERVICE

A. Upon issuance of Notice to Proceed, contact Department of Water and Power to arrange and pay for required installation of water and electrical meters and services.

B. Service connection points shall be as shown on Drawings unless otherwise directed by the utility company.

C. Contractor shall be responsible for labor and materials to the point of connection. If not shown on Drawings, Contractor shall estimate 100 feet to service points.

D. Upon final acceptance of Work, transfer billing to Department.

1.11 WARRANTY

A. Guarantee the entire irrigation system against defects in materials and workmanship for a period of 1 year from the date of acceptance of Work.

1. Should any deficiencies develop within the specified guarantee period due to inferior or faulty material and workmanship, correct such deficiencies to the satisfaction of Engineer at no cost to Department.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. Type of pipe material and fittings shall be in conformance with the following specification unless otherwise designated on Drawings.

1. Steel pipe shall be galvanized standard Schedule 40 steel water pipe complying with ASTM A53/A53M; jointed with galvanized, threaded, standard weight malleable iron fittings, and couplings. (U.S. Steel, Kelly Pipe).

2. Plastic pipe shall be high impact rigid unplasticized polyvinyl chloride PVC 1220 (Type 1, Grade 2), conforming to ASTM D1785, the minimum pressure rating to be not less than the working pressures indicated therein for the schedule and size listed. (PVC pipe marked with product standard PS-21-70 conforms to ASTM requirements).

a. Pipe to be homogeneous throughout and free from cracks, holes, foreign materials, blisters, deleterious wrinkles, and dents.

b. Use Schedule 40 PVC plastic pipe for installation on the discharge side of control valves and Schedule 80 PVC plastic pipe for continuously pressurized pipe on the supply side of control valves, unless otherwise indicated on Drawings.

c. Use Schedule 80 PVC plastic pipe when threaded joints are specified.

d. Continuously and permanently mark pipe with the following: Manufacturer's name or trademark, size, schedule, and type of pipe, working pressure at 73 degrees Fahrenheit and National Sanitation Foundation (NSF) approval.

B. Fittings and couplings for plastic pipe shall be threaded adapters with socket pipe for connections to threaded pipe. Plastic pipe fittings and couplings shall be PVC I or PVC I/II material supplied in the same schedule and size specified for the pipe. Indicate the type of plastic material, schedule, and size on each fitting or coupling.

C. Brass pipe and fittings shall be used for backflow preventer.

2.2 VALVES AND VALVE BOXES

A. General: Provide valves of the type and capacity designated in this Section and with the requirements specified. Valves shall be capable of satisfactory performance at a working pressure of 200 pounds per square inch (psi). Valve design shall permit disassembly for replacement of seals without removal of the valve body from the pipeline.

B. Shut-Off Valves: In sizes 2 inch and smaller shall be true-union ball valves. Sizes 2 1/2 inches and larger shall be iron body, brass trimmed with other features as per 2 inch size. (Aqua, Crane, Hammond HV667, NIBCO T-113).

C. Master Valves: Electrically operated, of brass or bronze with accurately machined valve seat surface, equipped with purple handle flow control adjustment, with capability for manual operation and readily disassembled for servicing; slow opening and closing; and self-cleaning.

D. Automatic Control Valves: Electrically operated, equipped with flow control adjustment, with capability for manual operation and readily disassembled for servicing; slow opening and closing; globe configuration; and marked for reclaimed water identification. Control valves shall be installed with union ball valves on the upstream side.

E. Gate Valves: Line size-valves sized 2 inches and larger shall be self-restrained cast iron body, bell X bell, with 2 inch square operating nut. (LEEMCO, Model LMV-XXBB).

F. Ball Valves: Flush valves for drip system flush valve assemblies shall be threaded 3/4 inch PVC type. (Spears, Model 2621-007G). QCV manifold shutoff isolation valve shall be of a Slo-Close type, a full block true union constructed of PVC with EPDM O-rings. Union nuts shall be molded of chlorinated polyvinyl chloride (CPVC) material. (LASCO, Model V14101N)

G. Quick-Coupling Valves and Assemblies: 2-piece heavy duty brass or bronze, self-closing with built-in stainless steel internal valve spring flow control and supplied in 3/4 inch, unless otherwise indicated on Drawings. Quick-coupler assembly shall include the valve, quick-coupler connection key, and hose swivel.

H. Valve Boxes and Covers: Use precast concrete valve boxes with metal traffic covers for lawns, road-ways and in hard surfaces, and fiberglass reinforced plastic valve boxes, green in color (unless otherwise indicated on Drawings) in planting areas, sized as required for easy access and field servicing of the valve. Use 10 inch diameter round valve box for shut-off quick couplers valves and 17 inch by 22 inch rectangular valve box for master valve and automatic control valves. Use 20 inch by 26 inch rectangular valve box for drip valve assemblies. Valve box cover shall be secured with a hidden latch mechanism or bolts.

2.3 BACKFLOW PREVENTER ASSEMBLY

A. Backflow prevention unit as indicated in the irrigation legend with related components, as approved by County of Los Angeles, Department of Public Health Services, Cross-Connection and Water Pollution Control Program (213) 881-4140 and conforming to City of Los Angeles Plumbing Code.

B. Backflow prevention unit assembly shall be enclosed in a stainless steel mesh enclosure with stainless steel brackets including a concrete pad sized to accommodate and secure the entire assembly in conformance with manufacturer's written instructions. (Strong Box “Smooth Touch” stainless steel, Model SBBC-30SS, as manufactured by V.I.T. Products)

2.4 SPRINKLER EQUIPMENT

A. Sprinklers, bubbler heads, and spray nozzles shall be of the types and sizes shown on Drawings.

B. Provide equipment of 1 type and flow characteristic from the same manufacturer and bearing the manufacturer's name and identification code in a position where they can be identified in the installed position.

C. Check valves to be inline PVC (Hunter H, Valcon ADV or King Bros.).

D. Water Conserving Flow Restrictor: Excess flow shut-off devices installed along streets adjacent to curbs. (Henderson, Valcon, Toro, or Flood Stop Limiter).

2.5 CONTROLLER UNIT

A. Controller Unit: As called for on Drawings (Calsense CS3000) and in conformance with Specifications.

1. Fully automatic with provisions for manual operation.

2. Sized to accommodate the number of stations or control valves included in the system. Fit with appropriate communication device to transmit data to Central Control program.

3. House outdoor pedestal models in a louver vented (upper and lower), vandal proof and weather-proof, stainless steel plate enclosure with pry-resistant piano hinged lockable door with a storage shelf.

4. Contractor shall contact Calsense representative before ordering unit for controller assembly model confirmation and any additional required equipment for Central Control program.

5. Flow Sensor: Flow sensor device shall be Calsense, Model FM-1B.

2.6 ELECTRICAL

A. Supply line voltage conductors with THW/THWN, 600-volt insulation rating, in conformance with ASTM D2219 and ASTM D2220.

B. Low voltage control conductors shall be Underwriters Laboratories, Incorporated (UL) approved direct burial type U.F., No. 14 AWG solid copper, unless otherwise required, in conformance with the control equipment manufacturer's written instructions. (Hatfield, Anixter, Cablex).

C. Rigid electrical conduit shall be Schedule 40 galvanized steel, threaded and bushed with packing placed in the ends to protect the wiring. Sweep ends of conduit into pull boxes to make splices.

D. Wire connections shall be joined by the use of an approved waterproof connector and sealer capable of satisfactory operation under continuous submersion in water. (3M, Model DBY/R and sealer capable of statisfactory operation under continuous submersion in water. (Rain Bird “Snap-Tite”, Splice-Kote, Gel-Tite, Scotch-Lok No. 3576).

2.7 THRUST BLOCKS

A. Where required for 3-inch plastic pipe, thrust block concrete shall be in conformance with RS Subsection 201-1, Class 420-C-2000 and Standard Plan S-651-0.

PART 3 - EXECUTION

3.1 IRRIGATION SYSTEM INSTALLATION

A. General:

1. Perform Work on the irrigation system, including hydrostatic and coverage tests, preliminary operational test of the automatic control system, and the backfill and densification of trenches and other excavations after topsoil Work and before planting.

2. Prior to installation, stake out pressure supply line routing and locations of sprinkler heads.

3. Plant large specimen plants (24 inch box or larger) before installing the irrigation system; reroute irrigation lines conflicting with specimen plant locations to clear the root ball.

4. With Engineer's approval, make adjustments where necessary to conform to actual field conditions unless otherwise noted on Drawings. Irrigation system layouts shown on Drawings shall be considered schematic or diagrammatic.

5. Make the irrigation system operational with uniform coverage of the areas to be irrigated, prior to planting.

6. Piping on Drawings shown in paved areas running parallel or adjacent to planted areas, are intended for design clarification only and shall be installed in the planted area whenever possible.

7. Make water and utility connections as shown on Drawings or as approved by Engineer. If utility connections are not shown on Drawings, Contractor shall estimate 100 feet to each service point. Replace sidewalks, curbs, or paving removed by the installation of the water and electrical meters and service.

## 3.2 TRENCH EXCAVATING AND BACKFILLING

A. Size trenches and other excavations to accommodate the irrigation system components, conduits, and other required facilities. Provide additional space to assure proper installation and access for inspections.

1. Trenching for irrigation system shall be done after completion of soil conditioning, finish grading operations, and concrete sitework.

2. Unless otherwise specified, the minimum depth of cover over pipelines and conduits shall be as follows:

a. Electrical conduit: 24 inches (36 inches under roadways, driveways, and parking lots).

b. Waterlines continuously pressurized: 24 inches (36 inches under roadways, driveways, and parking lots).

c. Lateral sprinkler lines: 12 inches. (24 inches under roadways, driveways, and parking lots).

3. Make the bottom of trenches true to grade and free of protruding stones, roots, or other matter which would prevent bedding of pipe or other facilities.

B. Trenches shall not be backfilled until required tests are performed.

1. Backfill trenches so that the specified thickness and density of the topsoil is restored throughout the entire depth of the trench.

2. Backfill may be flood compacted in landscaped areas to a dry density equal to adjacent soil in planting areas. Backfill shall join flush to adjacent grades without dips, sunken areas, humps, or other surface irregularities.

3. Mechanical compacted backfill shall be by means of hand-directed mechanical tampers in 4 inch lifts or roller equipment including sheeps foot, grid, smooth wheel (non-vibratory), pneumatic-tired (non-vibratory), and segmented wheel in maximum 12 inch lifts.

C. Compact trench backfill through paved areas in 8-inch layers to 90 percent relative compaction up to subgrade to receive paving and base material.

1. Resurface trenches through paved areas to match existing pavement.

D. If settlement occurs and subsequent adjustments of pipes, valves, irrigation heads, planting areas, or other construction are necessary, Contractor shall make required adjustments without additional cost to Department.

3.3 IRRIGATION PIPELINE INSTALLATION

A. General: Execute trench excavating and backfilling, including the depth of cover over the pipeline.

1. Install pipe fittings in conformance with manufacturer's written instructions and Reference Specifications. Furnish Engineer with manufacturer's written installation instructions which deviate from Specifications, for approval before pipe installation.

2. Bed pipe in at least 2 inches of finely divided soil to provide a firm, uniform bearing. Surround the pipe with additional finely divided soil to at least 2 inches over the top of the pipe.

3. Deposit trench backfill to anchor the pipe before the pipeline pressure testing, except that joints shall remain exposed until satisfactory completion of testing.

4. When 2 or more pipelines are installed in the same trench, separate the pipelines by a minimum horizontal clear distance of 4 inches. Install pipeline so that each pipeline, valve, or other pipeline component may be serviced or replaced without disturbing the other.

5. Make assemblies as specified and in conformance with manufacturer's written instructions or as detailed on Drawings.

6. During installation of pipe, fittings, valves, and other pipeline components, prevent foreign matter from entering the system. Temporarily cap or plug open ends at cessation of installation operations.

7. Make changes in pipeline size with reducer fittings. Do not use close nipples or bushings.

8. Place mainlines under paving in Schedule 40 PVC sleeves. Oversize the sleeves to house the pipe, fittings, and control wires.

9. Separate dissimilar metals by an approved "dielectric" coupling.

10. Recycle or reclaimed pressurized waterlines shall comply with County of Los Angeles Department of Public Health recycled/reclaimed and potable waters separation requirements and as directed by Engineer.

B. Steel Pipe:

1. Square cut and ream pipe ends to full size with a long taper reamer.

2. Cut threads with clean sharp dies.

3. Make joints with a non-toxic, non-hardening joint compound applied to the male threads only.

4. Wrap steel pipe embedded in the ground with 2 layers of seamless 10 mil Safe-T-Clad tape.

   a. Spiral wrap pipe with uniform laps. Apply second layer of wrap in the reverse direction of the first layer of wrap.

5. When wrapped pipe is specified, joints and remaining unwrapped portion of the pipeline shall be similarly wrapped after pressure testing.

C. Plastic Pipeline:

1. Join plastic pipe with socket type solvent welded fittings, threaded fitting, rubber ring fittings or by other means specified. Install steel pipe first when plastic pipe is joined to steel pipe. When connection is plastic to metal, female adapters shall be hand tightened, plus one turn with a strap wrench. Joint compound shall be non-lead base Teflon paste, tape of equivalent material approved by Engineer.

2. Cut square, externally chamfer approximately 10 to 15 degrees and remove burrs and fins.

3. Make solvent welded joints in conformance with ASTM D2855. Use the primer and solvent recommended by the pipe manufacturer. Solvent cement shall be in conformance with ASTM D2565. Cement shall be of a fluid consistency, not gel-like or ropy.

4. Install plastic pipe in conformance with ASTM D2774 and the requirements in this Section.

5. Exercise care in assembling pipeline with solvent welded joints so that stress on previously made joints is avoided. Handling of the pipe following jointing, such as lowering the assembled pipeline into the trench, shall not occur prior to the set times specified in ASTM D2855.

6. Apply primer and solvent to pipe ends so that no material is deposited on the interior surface of the pipe or extruded into the interior of the pipe during jointing. Wipe off excess cement on the exterior of the joint immediately after assembly.

7. Make threaded pipe joints using teflon tape or other approved jointing material. Do not use solvent with threaded joints.

8. Protect pipe from tool damage during assembly. Use vises with padded jaws and strap wrenches for installation of fittings and nipples.

9. Remove and replace plastic pipe which has been nicked, scarred, or otherwise damaged.

10. Snake plastic pipe from side to side in the trench to allow 1 foot of expansion and contraction per 100 feet of straight run.

11. Do not expose the pipeline to water for 24 hours after the last solvent welded joint is made.

## 3.4 INSTALLATION OF VALVES, VALVE BOXES, AND SPECIAL EQUIPMENT

A. Install valves and equipment in conformance with the details in a normal upright position, unless otherwise recommended by the manufacturer, and make readily accessible for operation, maintenance, and replacement.

B. Install valves of the same size as the pipeline in which they are installed, unless otherwise indicated on Drawings. Valves shall be installed in shrub areas whenever possible.

C. Install shut-off master valve, flow sensors, and sectional automatic control valves using galvanized unions with copper or brass seats Schedule 80 unions and shut-off valves, below ground. House shut-off master valves in a 16 inch by 22 inch rectangular valve box with the cover marked “S.O.M.V”. House sectional automatic control valves in a 16 inch by 22 inch rectangular valve box with the cover marked “R.C.V.” and its respective station number. House flow sensor in a 16 inch by 22 inch rectangular valve box with the cover marked “FS”.

D. Install quick-coupler valves projecting above grade 12 to 18 inches from curbs, pavement, and walks when possible. In lawn areas, such equipment shall be installed in a 12 inch by 16 inch rectangular valve box with the cover marked “Q.C.V”. Set flush to finish grade.

E. Set valve boxes 1/2 inch above grade in turf and 2 inches above finish grade in shrub areas on a minimum 12 inch deep layer of smooth pea gravel and set valves at depth to provide clearance between the cover and valve handle or key when the valve is in the fully open position. Place smooth pea gravel below valve. Do not cover valve with pea gravel.

F. Provide backflow preventers with pipe supports, enclosure, concrete, and the accessories necessary to secure the assembly. Assemble backflow preventers with pipes and fittings of galvanized steel. Install backflow preventers per prevailing codes, certified by a licensed inspector as required by Los Angeles County Department of Public Health, Cross-Connection and Water Pollution Control Program.

G. Install a line sized shut-off valve on the pressure side of sectional automatic control valve.

H. Each remote control valve shall have a plastic valve identification tag installed. Valve identification tag shall indicate the controller letter and station number.

3.5 IRRIGATION HEAD INSTALLATION AND ADJUSTMENT

A. Flush and pressure test mains and laterals, including risers before installing irrigation heads, and before performing a water coverage test.

B. Location, Elevation and Spacing:

1. Install the sprinkler heads in accordance with Drawings.

2. Spacing of sprinkler heads shall be installed for head to head coverage. In no case shall the spacing exceed the maximum recommended by the manufacturer.

3. In turf areas, install sprinklers 4 inches clear of adjacent walks, curbs, paving, headers, and similar improvements. In shrub and ground cover areas, install sprinklers 6 inches from paving and 12 inches from the face of building walls or windows.

4. Install irrigation heads adjacent to curbs, walks, paving, and similar improvements on pop-up sprinkler bodies with tops set flush with finished grade in turf areas and 1/2 inch above finish grade in shrub and ground cover areas.

5. Install sprinkler heads plumb. Adjust sprays or nozzle stream to cover landscape area without overspraying onto paving, fences, walls, or buildings.

C. Riser Installation:

1. Install risers perpendicular to finished grade to obtain optimum coverage of the area.

2. Risers shall be of galvanized steel for above grade installation and, Schedule 80 PVC plastic pipe for below grade installation.

3. Provide threaded pipe between the connection to the lateral or main and the sprinkler head.

4. Support risers for oscillating sprinkler heads installed above finished grade within 24 inches of curbs, walks, roadways, and similar improvements with a 3/4 inch galvanized steel stake driven into the ground and secured with 2 stainless steel clamps. Extend the upper end of the stake up to the bottom of the head. Extend the length of the stake 24 inches below the lateral line.

5. Riser assemblies shall be triple swing joint type with Schedule 80 PVC nipples and threaded fittings.

6. Install and adjust check valves as indicated on Drawings.

7. Install flow control limiters at lateral tee or ell on lateral line prior to installing swing joint assembly.

D. Irrigation Head Adjustment:

1. When irrigation heads are installed and the irrigation system is operating, adjust and balance each zone with remote control valves fully open to obtain uniform and adequate coverage.

2. Adjust irrigation heads having adjustable pin nozzles, screws, or orifices to provide adequate distribution of water over the coverage pattern. Without additional cost to Department, install larger or smaller nozzle cores in sprinkler heads and add or omit sprinkler heads as necessary to obtain head to head water coverage.

3. At no time shall the irrigation system to spray water on roadways or structures.

## 3.6 AUTOMATIC CONTROL SYSTEM INSTALLATION

A. Install a complete automatic irrigation control system, including the automatic controller, automatic control valves and wiring, and necessary accessories and utility service connections.

B. Install the automatic controller outside of the coverage pattern of the irrigation system at the location designated on Drawings or as directed by Engineer in conformance with the details.

C. Operate new controller in presence of Engineer to determine working order, before commencing Work.

D. Install flow sensor and wire to controller. Operate new flow sensor from Calsense controller in presence of Engineer to determine controller working order.

E. Install service wiring at a minimum depth specified, in galvanized steel electrical conduit from the service point to the controller. The minimum service wire shall be No. 12 AWG copper 600 volt type THW/THWN insulation, or as required by the controller manufacturer. Locate splices only in specified pull boxes and make splices with a waterproof packaged kit approved for underground use. Set top of pull boxes flush to finish grade on a 12 inch deep layer of pea gravel.

F. House control wiring in a conduit between the controller and an electrical pull box at the base of the controller. House control wire under paved areas in a Schedule 40 PVC pipe sleeve. Other wiring issuing from the electrical pull box shall be direct burial, installed in the main or lateral waterline trenches wherever practicable.

G. Provide total quantities of low voltage wire for RCV control as indicated on Drawings. Color code common wire ‘White’ with control wires ‘Black’ in color. Make splices in control wire with approved waterproof connectors in conformance with the requirements for service wire. Leave at least 2 feet of coiled slack at each splice and point of connection inside the valve boxes.

H. Test wiring for continuity, open circuits, and unintentional grounding prior to connection to equipment.

I. Leave the control system in operating condition with an operational chart mounted within the controller cabinet upon completion of Work.

J. Provide a minimum of 2 unused spare wires along the entire length of the mainline to each and every mainline end. Spare control wires shall be ‘Red’ in color. Label ‘Spare’ wire as such at controller.

## 3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Flushing: After completion, and prior to the installation of terminal fittings, flush the entire pipeline system to remove dirt, scale, or other material. After flushing, conduct the following tests in the sequence listed below. Provide equipment, materials, and labor necessary to perform the tests. Conduct tests in the presence of Engineer.

   a. Pipeline Pressure Test: Perform a water pressure test on pressure mains and laterals before couplings, fittings, valves, and the likes are concealed. Cap open ends after the water is turned into the line so that the air shall be expelled. Test pressure mains with control valves to lateral lines closed. After the pressure main test, open valves to test lateral lines. The constant test pressure and the duration of the test are as follows:

      1) Mains: 6 hours at 125 psi.

      2) Laterals: 2 hours at 100 psi.

   b. Sprinkler Coverage Test: Perform the coverage test after sprinkler heads have been installed and demonstrated that each section or unit in the irrigation system is balanced to provide uniform and adequate coverage of the areas serviced. Correct deficiencies in the system.

c. Operational Test: Evaluate the performance of components of the automatic control system for manual and automatic operation. During the maintenance period, and at least 15 days prior to final inspection, set the controller on automatic operation so that the system shall operate during such period. Make repairs, replacements, and adjustments until equipment, electrical Work, controls, and instrumentation are functioning as specified.

## 3.8 REPAIR AND RESTORATION

A. Department reserves the right to make temporary repairs as necessary to keep the irrigation equipment in operating condition. The exercise of this right by Department shall not relieve Contractor of responsibilities under the terms of the guarantee.

B. Repair settlement of backfilled trenches including the complete restoration of damaged planting, paving, or other improvements which may occur during a 90 day period, after final acceptance by Engineer, to Engineer's satisfaction, without expense to Department.

## 3.9 FINAL INSPECTION PRIOR TO ACCEPTANCE

A. At the time of the pre-maintenance period inspection, Engineer shall inspect Work, and if not accepted, shall prepare a list of items to be completed by Contractor. At the time of the post-maintenance period or final inspection, Work shall be re-inspected and final acceptance shall be in writing by Engineer.

B. Inspection for final acceptance of the irrigation system shall occur together with inspection for final acceptance of plantings as specified in PLANTING AND LANDSCAPING Section.

C. Contractor shall operate each system for Engineer at time of final inspection. Items deemed not acceptable by Engineer shall be reworked to the satisfaction of Engineer.

D. After the system has been completed, Contractor shall instruct Engineer and Harbor Department maintenance staff in the operation and maintenance of the irrigation system and shall furnish a complete set of operating and maintenance instructions.

E. Contractor shall show evidence to Engineer that Department has received accessories, charts, record drawings, and equipment as required before final inspection can occur.

## 3.10 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Notify Engineer 48 hours prior to time of the following required tests and inspections:

    a. Pressure supply line installation and testing.

    b. Automatic controller and wire installation.

    c. Lateral line and sprinkler installation (and drip tubing layout).

    d. Coverage test.

2. Notify Engineer 7 days prior to the time of final inspection.

3. Pipes jointed with rubber gaskets or threaded connections may be subjected to a pressure test at any time after partial completion of backfill. Pipelines jointed with solvent-welded PVC joints shall be allowed to cure at least 24 hours before testing

4. Subsections of mainline pipe may be tested independently, subject to the review of Engineer.

5. Furnish clean, clear water, pumps, labor, fittings, and equipment necessary to conduct tests or retest.

6. Refer to Field Quality Control Article of this Section for details of tests.

7. Sprinkler Layout Review:

    a. Stake each sprinkler location, remote control valve assembly, gate valve, and other irrigation system assemblies. Different sprinkler types shall be clearly marked. Revise layout as directed by Engineer. Layout review may be repeated at discretion of Engineer.

    b. Landscape edging, tree locations, and other known Project Site features shall be staked or clearly marked prior to sprinkler layout review.

    c. Where the irrigation system must be modified due to discrepancies between the irrigation plans and actual Project Site conditions, the layout shall be modified per the discretion of Engineer.

d. Layout review shall occur prior to installation of irrigation systems unless otherwise directed by Engineer. Failure to comply with the staking process shall result in Contractor taking full responsibility for system component locations.

8. Pre-maintenance review shall occur at substantial completion of irrigation system, record (as-built) drawings and controller charts. Construction maintenance period shall begin at time of Substantial Completion and final inspection.

3.11 CLEANING

A. Cleanup shall be made as each portion of Work progresses. Remove refuse and excess dirt from Project Site. Walks and paving shall be broomed or washed down, and damage done on Work of others shall be repaired at Contractor's sole cost and expense.

3.12 MAINTENANCE

A. Irrigate as necessary to maintain adequate growth and appearance in maintenance areas.

B. Irrigate between 1:00 a.m. and 4:45 a.m. unless otherwise indicated on Drawings. Irrigation shall be scheduled to supply quantities and frequencies consistent with seasonal requirements of the plant materials in the landscape. Controller programs shall be adjusted as dictated by the weather.

C. Provide personnel fully trained in phases of landscape irrigation systems operation, maintenance, adjustment, and repair, including copper, brass, galvanized, and plastic piping and brands of components, sprinkler heads, electrical control clocks, and valves.

D. Adjust sprinkler heads and risers, clean and flush heads, lines, screens and remove obstructions as necessary to provide adequate coverage to landscaped areas, to prevent excessive runoff and erosion, and to prevent watering hardscape.

E. Test irrigation systems the first and third Mondays of each month and immediately report to Engineer irrigation system problems not correctable as described in Paragraph D of Maintenance Article of this Section. Test any irrigation system when damage is suspected, observed or reported, and immediately report to Engineer any and irrigation system problems not correctable.

F. Engineer shall determine who makes repairs to landscape or to irrigation systems at Project Sites. Provide Engineer with a written description of Work to be performed with an estimate of the cost detailing labor and material costs. Engineer may approve such estimate and authorize, in writing, Contractor to proceed with repair.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Planting and landscaping materials and accessories

## 1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 31 00 00 - Earthwork

C. Section 32 01 91 - Plant Establishment, Maintenance, and Site Care

D. Section 32 10 01 - Site Paving and Surfacing

E. Section 32 13 14 - Concrete for Exterior Improvements

F. Section 32 84 00 - Planting Irrigation

G. Section 32 91 01 - Planting Soil and Preparation

H. Section 32 93 53 - Palm Trees

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Planting and Irrigation System bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. ANSI/AHIA Z60.2 - American Standard for Nursery Stock.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

C. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

A. Council of Tree and Landscape Appraisers:

Guide for Establishing Values of Trees and Other Plants

Manual for Plant Appraisers Handbook

B. U.S. Environmental Protection Agency (US EPA)

C. Standard Plans – City of Los Angeles Department of Public Works, Bureau of Engineering:

S-456-2 - Tree Planting and Root Control Barrier Detail

S-662-0 - Shrub and Tree Slope Planting

S-663-1 - Tree Staking and Guying Details

D. State of California Food and Agricultural Code

E. Sunset Western Garden Book

1.5 SEQUENCING

A. Do not commence planting until Project Site grading, soil import, and soil preparation have been completed and approved by Engineer.

B. Coordinate planting sequence with installation of utilities, drainage, and irrigation systems. Ensure drainage swales and flow lines have been established and accepted prior to planting shrubs and groundcover.

1.6 SUBMITTALS

A. Make submittals no later than 30 Calendar Days prior to start of Work of this Section.

B. Submit complete lists of landscape materials and equipment for approval by Engineer. Include manufacturer's name and address, specific trade names; catalog numbers complete with installation instructions, illustrations and descriptive literature, list of plants, stating quantity, size, and supplier photographs of material. Photo shall be actual current nursery stock available for tagging for Project. Clearly mark or underline proposed items in red.

C. Certifications: In addition to other required certification, furnish a certificate with each delivery of bulk material, stating its source, quantity, type of material furnished, and that such item or material conforms to Specifications requirements.

D. Submit copies of manufacturer's material specifications including Safety Data Sheets (SDS) and installation or application instructions.

E. Samples: Provide 2 samples of planting mulch in 0.25 cubic foot clear plastic bags.

F. Proposed schedule and sequence of Work plan for planting operation with start and completion date for trees, shrubs, and sodding.

G. Pathologist report certifying trees to be healthy and free from fungus or vascular infections.

H. Include the following in the schedules required by CONSTRUCTION SCHEDULES Section:

1. Proposed schedule and sequence of Work plan for planting operation with start and completion date for trees, shrubs, and sodding.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver to Project Site fertilizing and conditioning materials in original unopened containers, bearing manufacturer's name, guaranteed chemical analysis, name, trade mark, and in conformance with State of California Food and Agricultural Code.

1. Deliver bulk materials to Project Site with certificate that includes manufacturer and quantity in addition to chemical analysis, trade mark, and conformance to State law.

2. Deliver fertilizer and conditioners in waterproof bags showing weight, chemical analysis, and name of manufacturer.

3. Deliver to the installation area only enough plants that can be planted in one day.

4. Protect plant materials from damage during delivery.

B. Unloading: Unload plant materials and trees as carefully as possible to minimize root, trunk, and frond damage.

C. Storage and Protection: If plant materials cannot be planted immediately upon delivery to Project Site, store in a protected area.

D. Stockpiling: Mulch or amendment materials, stored on Project Site temporarily in stockpiles prior to placement shall be protected from intrusion of contaminants and erosion. Stockpiled materials shall be placed on tarpaulin, heavy polyethylene sheeting or other suitable barrier to protect paving surfaces from staining or soiling by stockpiled materials. Temporary storage means and methods shall be approved by Engineer.

E. Trees and Plant Material:

1. Do not prune before delivery, except as approved by Engineer. Protect bark, branches, and root systems from sun-scald, drying, sweating, whipping, and other handling and tying damage. Do not bend trees and plant material in such a manner as to destroy natural shape. Provide protective covering during delivery. Do not drop trees and plant material during delivery.

2. Deliver trees after preparations for planting have been completed and install immediately. If planting is delayed for more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist. Notify Engineer 3 days prior to delivery of trees. Do not deliver more trees and plants than can be planted in 1 day. It is not permissible to retain unplanted trees and shrubs on-site overnight.

3. Water as often as necessary to maintain root systems in a moist condition.

1.8 EXISTING UTILITIES AND PLANT MATERIALS

A. Exercise care in excavating and working near existing utilities. Contractor shall be responsible for damages to utilities which are caused by Contractor’s operations or neglect. Check existing utility drawings for existing utility locations. Reference drawings are available for information and substructure purposes only at Engineer's Office located at 425 S. Palos Verdes Street, San Pedro, CA (310) 732-3522.

B. Protect existing utilities, trees, lawns, and shrubbery that are not to be removed from damage or injury. If damaged or removed because of Contractor's operations, they shall be restored or replaced in, as nearly the original condition and location as is reasonably possible. Lawns shall be reseeded and covered with suitable mulch. Determine the cost of unreplaceable plant material in conformance with the "square inch" method as described by Council of Trees and Landscape Appraisers Manual for Plant Appraisers Handbook and Guide for Establishing Values of Trees and Other Plants.

C. Maintain existing plant material that is to remain within Project Site in healthy, thriving condition.

D. When existing planted areas are regraded, or removed and replaced because of Contractor's operations, the soil in these areas shall be prepared and replanted in kind. Approved Custom Topsoil Mix shall be used in planted areas that are being replaced due to Contractor’s operations. Materials, topsoil, soil preparation, amendments, planting, and plant maintenance during the establishment period shall conform to this Section. Refer to PLANTING SOIL AND PREPARATION Section for additional requirements.

E. Repair or replace existing improvements which are not designated for removal which are damaged or removed as a result of Contractor’s operations. When a portion of a sprinkler system must be removed, cap the remaining lines. Repairs and replacements shall be equal to existing improvements, and shall match them in finish and dimension.

F. Notify tenants or owners of adjacent property 14 Calendar Days to allow tenants or owners to salvage or relocate existing plants, trees, fences, sprinklers, and other improvements within the right-of-way which are designated for removal and would be destroyed because of Work.

G. Refer to BASIC SITE MATERIALS AND METHODS Section for additional requirements.

1.9 WARRANTY

A. Guarantee the life of trees for a period of 1 year, and other plant materials for a period of 6 months, from the date of Notice to Proceed (NTP) for Plant Establishment, Maintenance, and Site Care Period. Retain labor and materials bonds as a warranty.

B. Should soil deficiencies affecting plant health develop within the specified guarantee periods, correct such deficiencies at Contractor’s sole cost and expense prior to replacing the plant.

C. During 1-year guarantee period, remove trees that are found dead or not in a satisfactory growth condition from Project Site and replace with new trees at Contractor's sole cost and expense.

D. Remove trees requiring replacement before scheduled 1-year guarantee period and replace with matching trees along with adjacent disturbed improvements, i.e. irrigation, paving, lighting, planting, and the like with the same level of quality as originally indicated on Drawings, at Contractor’s sole cost and expense.

1. Remove and replace dead planting materials immediately unless required to plant in the succeeding planting season.

2. Replace planting materials that are more than 25 percent dead or in an unhealthy condition at end of warranty period.

PART - 2 PRODUCTS

2.1 MATERIALS

A. Topsoil: Refer to PLANTING SOIL AND PREPARATION Section for requirements.

B. Fertilizing and conditioning materials shall comply with the applicable requirements of State of California Food and Agricultural Code. Fertilizing materials shall be packaged, first grade, commercial quality products identified as to source, type of material, weight, and manufacturer's guaranteed analysis. Fertilizing material shall not contain toxic ingredients or fillers in quantities harmful to human, animal, or plant life.

C. Plants: Plants shall have a growth habit normal to the species in conformance with ANSI/AHIA Z60.2; shall be sound, healthy, vigorous and free from insect pests, plant disease, sun scalds, fresh bark abrasions, excessive abrasions, or other objectionable disfigurements. Tree trunks shall have normal well developed branch systems, and vigorous and fibrous root system, not root bound and shall be free of kinked or girding roots.

1. Plant names shall conform to Sunset Western Garden Book latest edition.

2. Contractor shall order plant material to ensure adequate quantities and sizes of plant material shall be available.
3. Tag one plant of each variety for identifying purposes.
4. Plants shall be inspected and approved prior to planting.
5. When plants of a specified kind or size are not available, substitution may be made upon approval by Engineer.
6. Other than normal side pruning during the growth period, no pruning shall be done prior to inspection at the nursery.
7. Specimen plant materials shall be site acclimated prior to planting, either through purchase from local beach side nurseries or site storage for a period of 10 weeks for autumn planting.
8. Trees shall conform to type and size noted on Drawings.
    a. Measure tree height from the root crown to the last division of the terminal leader and measure the diameter 6 inches above the root crown.
    b. Trees shall stand erect without support.
    c. Trees shall be boxed and established in their container for a minimum of 12 months unless noted otherwise on Drawings.
    d. Single Stem Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, conforming to ANSI/AHIA Z60.2 for type of trees required.
    e. Branching Height: For single-stem trees branching height shall be 5 feet and 0 inches and not more than 1/2 tree height or as required by Engineer or indicated on Drawings. Limbing up shall not deform natural form of the tree.
    f. Multiple-Stem Trees: Multiple-stem trees with multiple basal or low branched stems, and well-balanced crown, of height and caliper indicated, conforming to ANSI/AHIA Z60.2 for type of trees required. Unless specified otherwise multiple-stem trees shall have 3 to 5 stems minimum.
9. Shrubs and ornamental grasses shall be type and size selected from high quality well-shaped nursery stock.

10. Soil used to grow the tree or shrub shall be stable and highly decomposable to prevent subsidence of the root crown into the containers. The soil in the container shall be within 90 percent or the original volume. The container soil shall be fertile and free from excessive concentrations of nutrients and non-essential trace minerals. Herbicides shall not have been used in the production of the container plant. Soil shall be free of weeds.

11. Flatted plants shall be grown and remain in the flat until transplanted at Project Site. The soil and spacing of the plants in the flat shall ensure the minimum disturbance of the root system at time of transplanting. Maximum plants per flat shall be between 64 to 100 plants or as indicated on Drawings.

12. Sod (Turf Grass) shall be a mixture of specified proportions of well established lawn grass as indicated on Drawings. Sod shall be vigorous, well rooted, healthy turf, free from disease, insect pests, weeds, other grasses, stones, and other harmful, or deleterious matter.

    a. Contractor shall use 21 inch wide sections of roll sod whenever possible to reduce seams throughout the turf area.

    b. Soil base shall be sandy loam or loam and shall be clean topsoil.

    c. The following weed seeds are not permissible:

        1) Quackgrass

        2) Johnsongrass

        3) Nutsedge

        4) Poison ivy

        5) Canada thistle

        6) Poa annua (annual bluegrass)

    d. Premium Grade: Not more than 1 percent undesirable grass species or clover. No more than 2 weeds per 500 square feet.

    e. Commercial Grade: Not more than 10 percent undesirable grass species or clover. No more than 10 weeds per 500 square feet.

    f. Thickness of soil portion of sod shall not exceed 1/2 inch.

13. Sources: Unless otherwise specified, plant materials shall be from a well established Southern California region grower or nursery. Plants shall come from the following sources:

    a. Sources:

    Tree of Life Nursery 33201 Ortega Highway, P.O. Box 635, San Juan Capistrano, CA 92693 Phone: (949) 728-0685, https://californianativeplants.com/

    Las Pilitas Nursery 3232 Las Pilitas Road, Santa Margarita, CA 93453 Phone: (805) 438-5992, www.laspilitas.com

    Berylwood Tree Farm 1048 E. La Loma Avenue Somis, CA 93066, Phone: (805) 485-7601, berylwoodtreefarm.com

    Norman's Nursery 8665 Duarte Road, San Gabriel, CA 91775 Phone: (626) 237-0602, nngrower.com

    Monrovia Nursery Corporate Headquarters 817 E. Monrovia Place Azusa, CA 91702-1385, www.monrovia.com

    San Marcos Growers, 125 South San Marcos Road Santa Barbara, CA 93111 Phone: (805) 683-1561, www.smgrowers.com

    Native Sons Wholesale Nursery 379 West El Campo Road Arroyo Grande, CA 93420 Phone: (805) 481-5996, www.nativeson.com

    ABC Nursery, 424 E. Gardena Blvd. Gardena, CA 90248, Phone: (310) 327-9212, abcnursery.com

    Sea Crest Nursery 1396 Anderson Lane Santa Barbara, CA 93111 Phone: (805) 964-1643, www.seacrestnursery.com

    Boething Treeland Nursery 23475 Long Valley Road Woodland Hills, CA 91367 Phone: (818) 316-2000, www.boethingtreeland.com

D. Pre-Emergent Herbicides: Selected from the broad spectrum of commercial brands available subject to approval by Engineer and not in conflict with regulations governing its use. (Surflan, Betasan, Ronstar, or Gallery).

E. Cover Mulch:

1. Cover mulch shall be forest flair mulch 1/2 " to 1 1/2" from Asuinaga Green.

2. Base Feed Stock: Base feed stock material shall consist of uncontaminated clean green shredded tree trimmings and plant material native to the area, by a United States Composting Council's Seal of Testing Assurance (STA) approved facility. No inclusion of grasses of any kind, curbside material, or miscellaneous foreign debris shall be tolerated.

3. Composting: Material shall be initially ground to 4-inch-minus and composted by the formation of windrows which shall be turned every 3 days at a minimum, for 15 days. During this 15 day period, moisture, aeration, and temperature shall be monitored and recorded to assure that a minimum of 132 degrees F is obtained throughout the process. The temperature detailed in this Paragraph shall ensure that weeds which can germinate and raw material contained pathogens are destroyed, and a microbrial-friendly environment is formed for the production of required plant-growth nutrients. Windrows shall not become anaerobic.

4. Material Particle Size: Material shall be subsequently screened to the specified 1/2 inch to 1 1/2 inch particle size in order to achieve consistency and continuity of appearance.

F. Tree Stakes: Wood or as designated on Drawings.

1. Wood tree stakes, 3 inches outside diameter (O.D.) by 10 feet long, lodgepole grade, capable of standing in the ground at least 2 years.

G. Tree Ties:

1. Wire Type: No. 12 BWG galvanized soft steel wire covered with garden hose.

2. Cinch-Tie: Flexible vinyl with adjustable interlocking capability.

3. Support: Supports for staking shall be Treestrap, Model Number #3742T Hight Performance Biodegradable Tackstraps manufactured by GCS, Inc.

a. GCS, Inc. 401 Elm Avenue North Wales, PA 19454 (800) 360-3584 or (215) 661-9070, www.treestrap.com

H. Guys: Cables of 3/16-inch diameter, 7 strand cadmium plated complete with galvanized steel cable clamps and turnbuckles equal in strength to that of cable strength. Deadman stakes shall be 3/4-inch diameter steel pipe 3 feet long.

I. Root Barrier: Provide root barrier in accordance with City of Los Angeles, Department of Public Works Standard Plan S-456-2.

J. Trunk Guard:

1. Recycled content, polyethylene with ultraviolet inhibitors; 0.060 inch thick by 9 inches high by length for up to 4-inch diameter trunk.

a. Products:

1) Arborgard+ AG 9-4; Dimex LLC; (800) 334-3776.

K. Metal Edge Restraints: Paving restraint edging for straight and curvilinear borders at planting areas, DuraEdge as manufactured by J.D. Russell Company, (800) 888-7425, www.jdrussellco.com.

1. Comply with ASTM A1011/A1011M, hot-rolled, standard flexible, carbon steel landscape edging, fabricated in sections with stake pockets stamped, punched or welded to face of section approximately 30 inches apart to receive stakes.

2. Size: 5 inches wide

3. Thickness: 1/4 inch

4. Length: 16 feet

5. Connection Method: Double staked at overlap joints and designed to receive tapered steel stakes.

6. Finish: Hot dipped galvanized finish to be applied after steel landscape edging is cut to length and stake pockets are stamped, punched, or welded. Galvanization shall comply with ASTM A123/A123M. Zinc coverage shall be to a standard thickness of 3.3 mil.

7. Edging Stakes: Steel, tapered, 16 inches minimum length, and finished to match specified steel landscape edging.

8. Standard start and end sections, 90 degree corners, and splicers as required.

L. Inspection and Aeration Tube Materials:

1. Perforated polyvinyl chloride (PVC) pipe and fittings, 4 inch diameter as required for connections.

2. Structural foam polyolefin grate, 4 inch round to fit 4- inch PVC drain pipe, Model No. NDS 13S, as manufactured by NDS Inc., (887) 301-5242. Color: Sand. ADA Compliant/Heel Proof.

3. Filter Fabric: Mirafi 140 N non-woven drainage fabric as manufactured by TenCate Mirafi, (706) 693-2226.

4. Drain Rock: 3/4 inch diameter crushed stone drain rock, clean, washed, free of debris and sediment.

M. Weed Barrier: Biobarrier II Fabric available from Reemay, Inc., (800) 284-2780.

2.2 TESTS AND INSPECTIONS

A. Engineer shall perform the following required tests and inspections:

1. Condition of soil preparation, grading, surface drainage, and related underground utility works prior to planting trees and shrubs.

2. Tree pits prior to backfill and installation.

3. Plants (24-inch box size and larger) at their source prior to delivery to Project Site or elsewhere as may otherwise be directed by Engineer.

4. Plant material at time of delivery to Project Site. Planting tags shall be in place from nursery and remain until time of final acceptance walk through.

5. Condition of lawn area preparation prior to seeding or sodding.

6. Landscape plants and construction items to issue Notice to Proceed (NTP) for Plant Establishment, Maintenance, and Site Care Period.

7. Landscape plants and construction items at the end of Plant Establishment, Maintenance, and Site Care Period.

8. Engineer may reject trees not conforming to requirements specified in this Section. Trees may be considered defective and shall be marked as rejected. Ensure that replacement trees are of same size, species, and condition as trees originally specified.

B. Notify Engineer at least 48 hours prior to the time of required inspections listed in Paragraph 2.2A of this Article.

C. Notify Engineer 7 Calendar Days prior to the time of final inspection.

D. Plants shall be subject to inspection and approval of Engineer at the nursery, growing grounds, and upon delivery to Project Site for conformity with Specifications. Such approval shall not impair the right of further inspection and rejection during progress of Work.

E. Engineer reserves the right to make periodic inspections prior to final inspection. Should plant materials, installation procedures, or other conditions be observed that are not in accordance with Drawings or Specifications, Engineer shall direct Contractor to correct by repair or replace as appropriate. Engineer shall be the sole judge of the conditions of quality or acceptability and shall direct corrections in writing to Contractor. Rejected materials shall be immediately removed from Project Site and replaced with specific materials at Contractor's sole cost and expense.

## PART 3 - EXECUTION

### 3.1 VERIFICATION OF DIMENSIONS AND QUANTITIES

A. Verify scaled dimensions and quantities prior to start of Work of this Section.

B. Notify Engineer of discrepancies between Drawings and Specifications and actual Project Site conditions which would affect the execution of landscaping Work. Do not Work in areas where discrepancies occur until instructed by Engineer.

C. Plant quantities noted on Drawings are for the convenience of Contractor only and do not limit Contractor to those specific quantities. Furnish the quantities as may be necessary to do specific Work.

### 3.2 GRADING AND SOIL PREPARATION

A. Initial rough grading shall be as specified in EARTHWORK Section.

B. Topsoil placement shall be as specified in PLANTING SOIL AND PREPARATION Section.

C. In tree planting pits, remove soil 5 feet deep and 6 feet wide. For larger box trees, the width of the tree pit shall be 3 times the diameter of the rootball and deeper than the rootball at a minimum. Rototill the top 6 inches of sub-soil to roughen up the surface. Add 2 inches of pre-amended Custom Topsoil Mix and rototill into the existing sub-soil to a depth of 4 inches to avoid a sharp interface between the sub-soil and topsoil. Backfill tree pits with approved Custom Topsoil Mix.

D. Refer to PLANTING SOIL AND PREPARATION Section for additional requirements.

3.3 PLANTING

A. Plant materials, including plants previously approved at the nursery, shall be inspected prior to planting. Contractor shall be responsible for the condition of plants, planted or otherwise, until final acceptance by Department.

1. Perform planting with materials and equipment in conformance with procedure favorable to the optimum growth of the plant. Do not plant during windy conditions.

2. Except as noted for specimen planting, start planting operations following the completion and approval of the irrigation system.

B. Keep plant materials delivered to Project Site in healthy condition for planting. Do not allow plants to dry out.

C. Layout and Plant Locations:

1. Plant locations indicated on Drawings are approximate.

2. Plants may be re-spotted prior to planting as directed by Engineer, without additional compensation to Contractor.

3. Make a detailed layout of plants, in the planting areas and obtain approval of Engineer prior to planting operations.

4. Locate the first row of plants in areas designated for on-center spacing at 1/2 the designated spacing from the edge of the area.

D. Plants in boxes (24 inches or larger) shall be planted before installation of lateral irrigation lines. Re-route irrigation lines in conflict with specimen plant locations to clear the root ball.

E. Tree and Shrub Planting:

1. Plant trees, shrubs, ground cover, and vines as indicated on Drawings and specified in this Section as soon as Project Site and weather conditions are suitable. Planting operations shall be performed only during periods when beneficial results can be obtained. Suspend Work when drought, excessive moisture, or other unsatisfactory conditions prevail.

2. Make planting holes approximately square and 3 times the width of the plant container or root ball and larger if necessary to permit handling and planting without injury to the root system.

3. Prior to planting, fill planting hole with water to see if water drains in a reasonable time (approximately 4 hours). If drainage does not occur to the satisfaction of Engineer, auger a 4-inch diameter hole, to a depth 12 inches above the water table but not exceeding 12 feet deep and fill with clean drain rock. Do not penetrate water table with drain hole.

4. Do not install plants with broken or cracked root ball before or during planting.

5. Open and remove plant containers so that the plant root is not injured.

6. Remove plant containers or wrappings after plant is positioned in the planting hole.

7. Scarify soil at the bottom of planting holes to a depth of 6 inches.

8. Backfill the bottom portion of the planting hole with the approved specified backfill mix.

9. After "water settling" the bottom portion of the planting hole, set the plant approximately in the center of the planting hole and adjust the root crown flush to finish grade.

10. At straight tree rows, each tree in line of trees shall be perfectly plumbed and aligned in a straight line relative to the rest of the trees where indicated.

11. Stake trees as shown on Drawings in conformance with tree stake manufacturer's written instructions.

12. Backfill balance of the planting hole with the specified backfill mix and "water settle".

13. Prune or remove broken or damaged limbs.

14. Form a 4-inch high circular watering basin slightly larger than the planting hole for trees. Make the bottom of the basin at finish grade or slightly lower.

15. Restore the area around the plants to finish grade and dispose of excess soil.

16. Plants shall be set plumb and held in position until sufficient soil/backfill has been firmly placed around roots or ball. Container-grown plant material shall be installed such that the collars of the plants are slightly higher than immediate adjacent grades.

17. Do not cover the surface of the rootball with backfill soil or with mulch.

F. Tree Planting on Slopes:

1. Install supplemental drainage for trees planted on slopes. Place a 4-inch perforated pipe at the bottom on the tree pit on native soil. Perforated pipe shall daylight from the slope to allow drainage.

G. Ground Cover Planting:

1. Complete soil preparation and fine grading prior to planting of ground cover materials.

2. Plant ground covers in moist soil, spaced as indicated on Drawings.

3. Plant each plant with its proportionate amount of flat soil to minimize root disturbance.

4. The degree of soil moisture in the flat shall be such that the soil does not crumble when removing plant.

5. Following planting of ground cover, restore finish grade to ensure surface drainage.

H. Sod Lawn Planting: Complete fine grading and specified soil preparation before planting lawn. Sod for the lawn or turf areas shall be planted the same day as delivered by grower to Project Site.

1. The type of sod and the areas to be sodded shall be in accordance with Drawings.

2. Finished grade for sod shall conform to the sod grower's recommendation. Complete soil conditioning and fine grading before sodding. Do not operate heavy equipment over the finished grade after grading is completed. The finished grade shall be moist but not wet when sod is laid. Lay sod with closely fitted joints and stagger the ends of the strips. Plug openings with sod or topsoil.

3. Lightly irrigate within 2 hours after installing sod and before rolling. Roll seams and joints until the sod is bonded to the sub-soil.

4. Water the area to penetrate the subsoil at least 8 inches. Repeat watering to keep the sod moist until rooted in the subsoil. Protect sodded areas against foot traffic until the sod is well established. Re-sod damaged sod areas.

I. Vine Planting:

1. Plant vines adjacent to structures, unless otherwise indicated on Drawing. Remove temporary staking at the start of the plant establishment period unless otherwise directed by Engineer.

2. Affix branches to structures with 1-inch wide green plastic nursery tape or to walls with vine tie and wall tack.

3. After planting, cut back ficus, Hedera, and parthenocissus vines to 3 to 4 inches above finished grade.

J. Transplanting of Existing Plant Materials: In conformance with current horticultural practices:

1. Box or ball root system to maintain plant materials in a healthy, growing condition.

2. Transporting soil preparation shall be as specified in Planting Article of this Section.

3. Contractor may plant the equivalent size and kind of plant material in lieu of transplanting the specified item upon written approval by Engineer.

4. Stake or guy trees as specified in Tree Staking and Guying Article of this Section.

5. Should the transplanted plant or in lieu item die within the 1 year guarantee period, it shall be replaced with an equivalent size and type plant without added expense to Department.

K. Fertilizing:

1. Lawn, Grasses and Groundcovers: Apply fertilizer in conformance with soil testing laboratory recommendations. Type of fertilizer and rate of application shall be in conformance with soil testing laboratory recommendations. Water the area after applying fertilizer. Fertilizer applications shall be done under the inspection of Engineer.

3.4 METAL EDGE RESTRAINT INSTALLATION

A. Install in conformance with manufacturer’s written instructions and as shown on Drawings.

3.5 WOOD MULCH APPLICATION

A. Depth of mulch shall be 3-inch uniform distribution unless otherwise indicated on Drawings.

B. Keep mulch at least 6 inches clear for tree trunks and stems of shrubs, ornamental grasses, and groundcovers unless shown otherwise on Drawings.

3.6 INSPECTION TUBE INSTALLATION

A. Install filter-wrapped inspection and aeration tubes at tree and palm tree pits as indicated on Drawings.

3.7 APPLICATION OF PRE-EMERGENT HERBICIDES

A. Immediately after planting, treat non-seeded planting areas with a pre-emergent weed and grass seed control agent; spray or spread on in conformance with the manufacturer's written instructions including approved species and time of application.

B. Check manufacturer's list of ornamental to determine toxicity with regard to selection of type of material used.

## 3.8 TREE STAKING AND GUYING

A. Tree Staking: Stake trees with wood lodgepole materials in conformance with the following:

1. Install stake vertically on the windward side of the tree. Position the stake at least 6 inches from the trunk at ground level and 30 inches into the soil, avoiding injury to the roots or breaking the root ball.

2. Secure plant trunk to the stake with 2 ties; one just below the head of the tree and one 2 feet above finish grade.

3. Make tie loop 1 inch greater in diameter than the trunk.

4. Attach tie to wooden stake with 1 furring nail at the tie locations.

5. Secure wire ties by twisting the ends.

6. In parkways, locate the stake on the side away from the roadway.

B. Guying shall be done immediately after planting. Install 3 guys per tree in conformance with the following:

1. Secure each guy wire to a driven stake located at a horizontal distance from the tree equal to the vertical distance from ground to the connection of guy wire on the tree branch.

2. Anchor each guy wire to a driven stake located at a horizontal distance from the tree equal to the vertical distance from ground to the connection of guy wire on the tree branch.

3. Cover each guy wire with white colored garden hose or plastic tubing to a height of 6 feet above grade. Remove slack in each guy wire by hand adjusting the turn-buckle so as not to bend the tree.

## 3.9 SLOPE STABILIZATION AND EROSION CONTROL

A. Topsoil grading and conditioning shall be in conformance with Grading and Soil Preparation Article of this Section, unless otherwise indicated on Drawings.

## 3.10 WATERING

A. Keep planted areas moist. Provide whatever system is necessary to provide adequate water at the planted areas without causing erosion detrimental to the planting area.

B. Water plants immediately after planting.

## 3.11 PLANT ESTABLISHMENT AND MAINTENANCE

A. Refer to PLANT ESTABLISHMENT, MAINTENANCE, AND SITE CARE Section for requirements.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Topsoil and preparation

B. Fertilizing and conditioning materials

C. Soil preparation

## 1.2 RELATED SECTIONS

A. Section 31 00 00 - Earthwork

B. Section 32 13 14 - Concrete for Exterior Improvements

C. Section 32 84 00 - Planting Irrigation

D. Section 32 90 01 - Planting and Landscaping

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Import Custom Topsoil bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. Council of Tree and Landscape Appraisers:

Manual for Plant Appraisers Handbook

Guide for Establishing Values of Trees and Other Plants

B. Soil Science Society of America (SSSA):

Methods of Soil Analysis, Part 1, Physical and Mineralogical Methods, 1986 Chapter 15, pages 383 to 411, Soil Texture and Particle Size

Methods of Soil Analysis, Part 3, Chemical Methods, 1996 Chapter 34, pages 965 to 977 and pages 1001 to 1002, Determination of Organic Carbon Chapter 37, pages 1088, Determination of Total Nitrogen Various Chapters, Determination of Fertility and Presence of Non-Essential Trace Minerals

C. State of California Food and Agricultural Code

D. United States Department of Agriculture (USDA):

Agricultural Handbook No. 60

Method 2, page 84 - Preparation of Saturation Extract

Method 21a, page 102 - pH Determination

Method 18, pages 100-101 -Determination of Cation Exchange Capacity

Method 34b - Hydraulic Conductivity

1.5 SUBMITTALS

A. Make submittals no later than 30 Calendar Days prior to start of Work of this Section.

B. List source of landscape topsoil with horticultural soil report.

C. Certification: In addition to other required certification, furnish a certificate with each delivery of bulk material, including topsoil, stating its source, quantity, type of material furnished and that such item or material conforms to specification requirements.

D. Manufacturer’s product data sheets, material specifications including Safety Data Sheets (SDS) and installation instructions or application.

E. Proposed source of Class “A” topsoil accompanied by the written report from a soil testing laboratory. The horticultural suitability report for Class “A” topsoil shall also contain the test results for the additional parameters listed in Article 2.1 (Paragraph A) of this Section. A minimum of 4 samples shall be taken for testing from evenly distributed areas at the import source.

1. Soil testing report for site soil to be compared to test for imported topsoil for structural, agricultural, and chemical suitability. Testing to be done at:

   a. Wallace Laboratories 365 Coral Circle El Segundo, CA 90245, (310) 615-0116, us.wlabs.com

2. Comply with other testing requirements for import fill as specified in EARTHWORK Section.

1.6 EXISTING UTILITIES AND PLANT MATERIALS

A. Refer to PLANTING AND LANDSCAPING Section for requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver fertilizing and conditioning materials to Project Site in original unopened containers, bearing manufacturer's name, guaranteed chemical analysis, name, trade mark, and in conformance with State of California Food and Agricultural Code.

1. Deliver bulk materials to Project Site with certificate that includes name of manufacturer and quantity in addition to chemical analysis, trade mark, and conformance to State law.

2. Deliver fertilizers and conditioners in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.8 WARRANTY

A. Should soil deficiencies affecting plant health develop within the specified guarantee periods, correct such deficiencies to the satisfaction of Engineer at no additional cost to Department.

PART - 2 PRODUCTS

2.1 MATERIALS

A. Topsoil: Designated as Class A (imported) and referred to in this Section as Class "A" topsoil. Engineer shall determine the suitability of topsoil prior to use. Transport topsoil from the source to its final position unless stockpiling is called for.

1. At least 30 days before scheduled use, submit the proposed source of topsoil to Engineer for approval. Submit a written request for approval, accompanied by a written report from a soil testing laboratory registered by State of California for agricultural soil evaluation which states that the proposed source complies with Specifications and that the soil is agriculturally suitable. Contractor shall comply with recommendation of the soil testing laboratory and add additional soil amendments, necessary to achieve nutrient levels to support healthy plant growth, at no additional cost to Department.

2. Class "A" topsoil shall be from a source outside the limits of Project selected by Contractor and in compliance with the requirements. A minimum of 3 tests are required. Engineer may make inspections and require tests as deemed necessary to determine that the material meets the requirements.

a. Class “A” topsoil shall be of a uniform composition and structure, fertile and friable sandy loam garden soil character suitable for sustaining and promoting the growth of the plants; and be free of roots, clods and stones larger than 1-inch in greatest dimension, pockets of coarse sand, noxious weeds, sticks, brush and other litter and not be infested with nematodes or other undesirable insects and plant disease organisms. It shall be friable and have sufficient structure in order to give good tilth and aeration to the soil. Continuous, air-filled pour space content on a volume/volume basis shall be at least 15 percent on a dry weight basis. Class “A” topsoil shall meet the following additional requirements:

1) Soil shall be sandy loam or loam. The definition of soil texture shall be USDA classification scheme. Gravel over 1/4 inch in diameter shall be less than 10 percent by weight.

2) Hydraulic conductivity rate shall not be less than 1 inch per hour nor more than 20 inches per hour when tested in conformance with USDA Handbook Number 60, Method 34b or other approved methods.

3) Fertility: The range of essential elemental concentration in soil shall be as follows:

| | Ammonium Bicarbonate/DTPA Extraction parts per million (mg/kilogram) dry weight basis |
|---|---|
| | |
| phosphorus | 2 to 40 |
| potassium | 40 to 220 |
| iron | 2 to 35 |
| manganese | 0.3 to 6 |
| zinc | 0.6 to 8 |
| copper | 0.1 to 5 |
| boron | 0.2 to 1 |
| magnesium | 50 to 150 |
| sodium | 0 to 100 |
| sulfur | 25 to 500 |
| molybdenum | 0.1 to 30 |

a) Class “A” topsoil may need to be amended and conditioned to optimize plant growth.

4) The soil pH range measured in the saturation extract (Method 21a, USDA Handbook Number 60) shall be in the range of 6.0 to 7.9.

5) The salinity range measured in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 0.5 to 2.0 dS/m at 25 degrees centigrade. If calcium and sulfate ions both exceed 20 milliequivalents per liter in the saturation extract, the maximum salinity shall be 3.0 dS/m.

6) The maximum concentration of soluble chloride in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 150 mg/l (parts per million).

7) Boron content shall be no greater than 1.0 mg/l (parts per million) as measured on the saturation extract (Method 3a Handbook Number 60).

8) Sodium Absorption Ratio (SAR) shall be 3 (Method 20b, USDA Handbook Number 60).

9) Available aluminum shall be less than 5 parts per million.

10) Sufficient soil organic matter shall be present to impart good physical soil properties but not be excessive to cause toxicity or cause excessive reduction in volume of soil due to decomposition of the organic matter.

11) Free calcium carbonate (limestone) shall not be present.

12) Soil shall not have hydrophobic properties.

13) Heavy Metals: The maximum permissible elemental concentration in the soil shall not exceed the following concentrations:

| | Ammonium Bicarbonate/DTPA Extraction parts per million (mg/kilogram) dry weight basis |
|---|---|
| arsenic | 1 |
| cadmium | 1 |
| chromium | 10 |
| cobalt | 2 |
| lead | 30 |
| mercury | 1 |
| nickel | 5 |
| selenium | 3 |
| silver | 0.5 |
| vanadium | 3 |

a) If the soil pH is between 6 and 7, the maximum permissible elemental concentration shall be reduced to 50 percent. If the soil pH is less than 6.0, the maximum permissible elemental concentration shall be reduced 75 percent. No more than three metals shall be present at 50 percent more of the above values.

14) Germination and growth of monocots and dicots shall not be restricted more than 10 percent. Total petroleum hydrocarbons shall not exceed 50 mg/kg dry soil measured in conformance with the modified U.S. Environmental Protection Agency (US EPA) Method No. 8015. Total aromatic volatile organic hydrocarbons (benzene, toluene, xylene, and ethylbenzene) shall not exceed 0.5 mg/kg dry soil measured in conformance with US EPA Method No. 8020.

15) Correct iron deficiency where needed with Becker Underwood Sprint 138 Fe or other commercial FeEDDHA except use Sprint 330 Fe or commercial FeDTPA for palms.

16) Topsoil shall be blended with organic matter. No sewage sludge.

17) Class “A” topsoil shall meet other requirements as specified in EARTHWORK Section.

b. Suppliers: Earthworks (951) 782-0260

B. Fertilizing and conditioning materials shall comply with the applicable requirements of State of California Food and Agricultural Code. Fertilizing materials shall be packaged, first grade, commercial quality products identified as to source, type of material, weight, and manufacturer's guaranteed analysis. Materials shall not contain toxic ingredients or fillers in quantities harmful to human, animal, or plant life.

1. Fertilizing and Conditioning Materials (all other plant materials except palms): Submit a certificate of compliance stating that the materials meet Specifications.

    a. Soil Sulfur: Guaranteed analysis of 99 percent sulfur (powder form).

    b. Iron Sulfate: Guaranteed analysis of 20 percent iron derived from ferric and ferrous sulfate and 10 percent sulfur.

    c. Gypsum: Hydrated calcium sulfate product containing 23 percent calcium and 18 percent sulfur with a guaranteed analysis of 84 percent calcium sulfate (powder form)

    d. Commercial Fertilizer: Granular product having a chemical analysis of 12-12-12 unless otherwise specified on Drawings; free-flowing material delivered in unopened sacks. Do not use material which becomes caked or otherwise damaged.

    e. Ammonium Sulfate: 21 percent ammoniacal nitrogen and 24 percent combined sulfur. (21-0-0)

    f. Calcium Nitrate: 14.5 percent nitrate nitrogen, 1 percent ammoniacal nitrogen and 19 percent calcium

    g. Calcium Ammonium: 13.5 percent nitrate nitrogen, 13.5, Nitrate: percent ammoniacal nitrogen and 8 percent calcium (27-0-0)

    h. Triple Superphosphate: 45 percent P2O5 and 15.5 percent calcium (0-45-0)

    i. Potassium Sulfate: 50 percent potash and 18 percent combined sulfur (0-0-50)

    j. Ureaformaldehyde: 38 percent slow-release of methylene urea (38-0-0)

k. 21-7-14: 9.9 percent nitrate nitrogen, 11.1 percent ammoniacal nitrogen, 7 percent P2O5, 14.0 percent K2O, 1.4 percent calcium, 5.1 percent combined sulfur

l. Organic soil conditioner (no sewage sludge or biosolids):

1) Humus material shall have an acid-soluble ash content of no less than 6 percent and no more than 20 percent. The organic matter content shall be at least 50 percent on a dry weight basis.

2) The pH of the material shall be between 6 and 7.5.

3) The salt content shall be less than 10 millimho/cm at 25 degrees C (ECe less than 10) in a saturated paste extract.

4) Boron content of the saturated extract shall be less than 1.0 part per million.

5) Silicon content (acid-insoluble ash) shall be less than 50 percent.

6) Calcium carbonate shall not be present if to be applied on alkaline soil.

7) Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.

8) Composted wood products are conditionally acceptable (stable humus must be present). Wood based products are not acceptable which are based on red wood or cedar.

9) Sludge-based materials are not acceptable.

10) Carbon to nitrogen ratio shall be less than 25:1.

11) Compost shall be aerobic without malodorous presence of decomposition products.

12) Maximum particle size shall be 0.5 inch, 80 percent or more shall pass a No. 4 screen.

13) Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| arsenic | 20 | copper | 150 | selenium | 30 | cadmium | 15 |
| lead | 100 | silver | 10 | chromium | 100 | mercury | 10 |
| vanadium | 200 | cobalt | 50 | moloybdenum | 20 | zinc | 200 |
| nickel | 100 | | | | | | |

m. Organic Fertilizers:

| | |
|---|---|
| Blood meal | Feather meal |
| Bone meal | Rock phosphate |
| Fish emulsion | Alfalfa meat |
| K-Mag (sul-po-mag) (0-0-22) | |

C. To ensure conformance to this Section, provide soil sampling testing of backfill soil when requested by Engineer. Testing cost of these samples shall be at sole cost and expense of Contractor.

## PART 3 - EXECUTION

### 3.1 VERIFICATION OF DIMENSIONS AND QUANTITIES

A. Verify scaled dimensions and quantities prior to start of Work of this Section.

B. Notify Engineer of discrepancies between Drawings and Specifications and actual Project Site conditions which would affect the execution of the landscaping Work. Do not Work in areas where discrepancies occur until instructed by Engineer.

### 3.2 GRADING AND SOIL PREPARATION

A. Initial rough grading shall be as specified in EARTHWORK Section.

B. Earth and topsoil placement shall include removing existing soil as required to allow for backfilling, spreading, densifying, cultivating, raking, fertilizing and conditioning of topsoil to within 1/10 of a foot of the finish grade.

C. Top 24 inches of existing soil in planting areas shall be removed and disposed of off Department property. Replace with Class “A” topsoil to achieve finish grade in accordance with Drawings. Place topsoil in 8 inch maximum lifts. Topsoil shall be amended in conformance with soil testing report and approved by Engineer prior to importing on Project Site. Actual amount of existing soil to be removed and replaced or the amount and type of soil conditioning shall be determined by the soil laboratory recommendations based on the soil samples tested. If the soil testing report deems the soil unsuitable to sustain plant growth, a minimum of 24 inches of existing soil shall be removed and replaced in the planting areas.

D. Sub-soil Preparation: After excavation and prior to backfilling, test sub-soil for compatibility with the Class “A” import topsoil. Amend sub-soil in conformance with soil laboratory recommendations. After amending sub-soil, add 2 inches of pre-amended Class “A” topsoil and rototill into existing sub-soil to a depth of 4 inches to avoid a sharp interface between the sub-soil and topsoil.

E. After sub-soil preparation, backfill planting areas with approved Class “A” topsoil 24 inches deep unless otherwise indicated on Drawings.

F. Do not Work topsoil when it is so wet or dry as to cause excessive compaction or forming of hard clods or dust.

G. Finish Grading:

1. Make finish grade smooth, uniform, and free of abrupt grade changes and depressions to ensure surface drainage.

2. Finish grade below adjacent paving, curbs, or headers shall be 2 inches in shrub or ground cover areas and one 1 inch in lawn areas unless otherwise shown on Drawings.

3. Finished surfaces shall be clean of litter and debris prior to planting.

H. Trenching when done after completion of soil conditioning or finish grading shall be backfilled so that the specified topsoil thickness in the trench is restored.

## 3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Notify Engineer at least 48 hours prior to time of the following required inspections:

   a. Soil sampling for horticultural suitability of the proposed topsoil at the source site.

   b. Soil sampling of the approved topsoil after it has been placed on Project location.

2. Refer to PLANTING AND LANDSCAPING Section for additional requirements.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Palm trees

1.2 RELATED SECTIONS

A. Section 32 01 91 - Plant Establishment, Maintenance, and Site Care

B. Section 32 84 00 - Planting Irrigation

C. Section 32 90 01 - Planting and Landscaping

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Palm Trees bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ANSI Z60.1 - Nursery Stock.

B. Council of Tree and Landscape Appraisers:

C. Guide for Establishing Values of Trees and Other Plants

D. Manual for Plant Appraisers Handbook

E. State of California Food and Agricultural Code

F. Sunset Western Garden Book

1.5 SUBMITTALS

A. Make submittals no later than 30 Calendar Days prior to start of Work of this Section.

B. Submit complete lists of materials and equipment for approval by Engineer. Include manufacturer's name and address, specific trade names, catalog numbers complete with installation instructions, illustrations, and descriptive literature. Clearly mark or underline proposed items in red.

C. Certification: In addition to other required certification, furnish a certificate with each delivery of bulk material stating its source, quantity, type of material furnished, and that such item or material conforms to Specifications requirements.

D. Submit copies of manufacturer's material specifications including written installation instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver to Project Site fertilizing and conditioning materials in original unopened containers, bearing manufacturer's guaranteed chemical analysis, name, trade mark, and in conformance with State of California Food and Agricultural Code.

1. Deliver bulk materials to Project Site with certificate that includes manufacturer and quantity in addition to chemical analysis, trade mark, and conformance to State law.

2. Deliver fertilizers and conditioners in waterproof bags showing weight, chemical analysis, and name of manufacturer.

3. Deliver to the installation area only enough trees that can be planted in 1 day.

4. Protect plant materials from damage during delivery.

B. Unloading: Unload palm trees as carefully as possible to minimize root, trunk, and frond damage.

C. Storage and Protection: If palm trees cannot be planted immediately upon delivery to Project Site, store in a protected area and "heel-in" palm trees. Take extra scheduling measures with other Project subcontractors to minimize time that palms are "heeled-in".

1.7 WARRANTY

A. Guarantee newly planted palm trees for a period of 2 years from the date of Notice to Proceed (NTP) for Plant Establishment, Maintenance, and Site Care Period. Retain labor and materials bonds as a warranty.

B. Should soil deficiencies affecting plant health develop within the specified guarantee periods, correct such deficiencies at Contractor's sole cost and expense at no additional cost to Department prior to replacing the plant.

C. During 2-year guarantee period, remove palm trees that are found dead or not in a satisfactory growth condition from Project Site and replace with new palm trees at Contractor's sole cost and expense and at no additional cost to Department.

D. Remove palm trees requiring replacement before scheduled 2-year guarantee period and replace with matching palm trees along with adjacent disturbed improvements, i.e. irrigation, paving, lighting, planting, and the like with the same level of quality as originally indicated on Drawings, at Contractor’s sole cost and expense and at no additional cost to Department.

E. Guarantee palms to be healthy and free from fungus or vascular infections. Certified pathologist shall provide documented report of condition of trees to Engineer at Contractor’s sole cost and expense and at no additional cost to Department.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Palm Tree Soil:

1. Sand for Palm Pits: Number 16 medium silica sand, washed, clean, free of silt and clay, conforming to:

a. Mesh Designation: Percent Passing:

| | |
|---|---|
| 8 mesh | 99 to 100 |
| 12 mesh | 95 to 100 |
| 16 mesh | 0 to 80 |
| 20 mesh | 0 to 50 |
| 30 mesh | 0 to 20 |
| 40 mesh | 0 to 5 |

b. Good water retention.

c. Good percolation for excess water.

d. Low in salts and boron. In no case is boron allowed to measure greater than 1 part per million (ppm) as measured on saturation extract method.

2. To ensure conformance to this Section, provide soil sample testing of backfill soil when requested by Engineer. Testing cost of these samples shall be at Contractor's sole cost and expense at no additional cost to Department.

B. Fertilizing and Conditioning Materials: Fertilizers and conditioners shall comply with the applicable requirements of State of California Food and Agricultural Code. Fertilizers shall be packaged, first grade, commercial quality products identified as to source, type of material, weight, and manufacturer's guaranteed analysis. Fertilizers shall not contain toxic ingredients or fillers in quantities harmful to human, animal, or plant life.

1. Palm Fertilizer: Consisting of following minimum percents by weight:

   9 percent Nitrogen

   3 percent Phosphoric Acid

   9 percent Potash

   3 percent Calcium

   4 percent Magnesium

   2 percent Iron

   5 percent Humic Acids

   a. Manufacturers: Gro-Power Palm and Tropical Fertilizer (909) 393-3744.

2. Palm Frond Foliar Drench: Acceptable manufacturers with following rates for a 100-gallon tank mix:

   a. Kocide (Copper TS) 101 w.p. (3/4 pound) or Manzate – 1 quart/100 gallons.

   b. WR Grace’s Minor-Gro (1/2 cup).

   c. Hydrated Urea (5 cups or 2 1/2 pounds).

   d. Spreader Sticker – 8 ounces "Basic H."

   e. Benlate – 100 gallons of water per 1 pound

C. Palm Trees: Palm trees shall have a growth habit normal to the species in conformance with ANSI Z60.1; shall be sound, healthy, vigorous and free from insect pests, plant disease, sun scalds, fresh bark abrasions, excessive abrasions or other objectionable disfigurements. Tree trunks shall have normal well developed branch systems, and vigorous and fibrous root system, not root bound and shall be free of kinked or girding roots.

1. Palm tree names shall conform to Sunset Western Garden Book, latest edition.

2. Contractor shall order palm trees to ensure adequate quantities and sizes of palm trees shall be available.

3. Tag 1 plant of each variety for identifying purposes.

4. Palm trees shall be inspected and approved prior to planting.

5. When palm trees of a specified kind or size are not available, substitution may be made upon approval by Engineer.

6. Palms shall be from stock grown and acclimated for coastal planting situations. Lack of performance or death of trees not acclimated to Project Site shall be warranted in conformance with Warranty Article of this Section.

7. Measure palms from the ground line to the base of the growing bud.

8. Palm trees shall conform to type and size noted on Drawings.

    a. Measure palm tree height from the root crown to the top of cleaned brown trunk, palm head and frond to be excluded from the measurement.

    b. Trees shall stand erect without support.

9. Defronding and Tying:

    a. In preparing palm trees for relocation, remove dead fronds. Do not injure palm trunk. Neatly cut off green fronds below the horizontal position, leaving a 4-inch stub.

    b. Raise remaining fronds above the horizontal and tie together in 2 locations around crown in an upright position. Do not bind or injure crown.

c. Use a lightweight cotton rope or cord, not less than 1/4 inch in diameter, to tie fronds. Do not use wire. After tying, hedge-off tips of fronds above crown approximately 1/4 to 1/2 of frond length. Complete defronding and tying Work prior to digging rootball.

d. In no case shall the use of boot spikes be permitted.

10. Digging rootball at original source of palm trees:

a. When digging rootball, do not excavate closer than 24 inches to palm trunk at ground level. Extend excavation below major root system to a minimum depth of 6 feet.

b. Cut bottom of rootball square and perpendicular to palm trunk. Do not cut down size of rootball in width or depth.

c. Do not free fall, drag, roll, or abuse palm tree or put a strain on crown during palm tree removal.

d. Use a protective device around trunk of palm tree while lifting and relocating so as not to scar or skin trunk. Device may consist of either a rubber or leather sling made with timbers sufficiently sized to withstand choker pressure.

e. Do not allow palm tree to be balled out or laid on ground with rootball exposed to direct sunlight. Keep rootball continuously moist and shaded.

11. Soil used to grow the palm tree shall be stable and highly decomposable to prevent subsidence of the root crown into the containers. The soil in the container shall be within 90 percent or the original volume. The container soil shall be fertile and free from excessive concentrations of nutrients and non-essential trace minerals. Herbicides shall not have been used in the production of the container plant. The soil shall be free of weeds.

D. Wood Bark Mulch: As specified in PLANTING AND LANDSCAPING Section.

E. Inspection and Aeration Tube Materials: As specified in PLANTING AND LANDSCAPING Section.

2.2 SOURCE QUALITY CONTROL

A. Palm Tree Source Inspection:

1. Coordinate with Engineer to locate palm trees within the same palm grove so that brown trunk height and overall appearance of the palm trees are consistent.

2. In a grove with similar palm trunk heights, maximum allowable brown trunk height variation shall be 12 inches. Coordinate with Engineer to adjust palms with acceptable trunk curvature so that visual impact is minimized.

3. Palm trees to be installed on Project shall be inspected for disease and overall health by a licensed plant pathologist. Cost of this service shall be at Contractor's sole cost and expense at no additional cost to Department.

4. Submit written documentation to Engineer that palm trees have been determined "disease free" by plant pathologist.

5. Plant pathologist shall inspect palm trees for health, defronding, and frond tying. Palms rendered unsuitable for planting because of this inspection shall be rejected, removed, and replaced at Contractor’s sole cost and expense and at no additional cost to Department.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to beginning Work under this Section, examine previously installed Work and verify that such Work is complete and to the point where palm tree installation may commence properly.

B. Verify that hardscape areas and irrigation system are in place and accepted by Engineer.

C. Verify scaled dimensions and quantities prior to start of Work.

D. Notify Engineer of discrepancies between Drawings and Specifications and actual Project Site conditions which would affect the execution of landscaping Work. Do not Work in areas where discrepancies occur until instructed by Engineer.

E. Plant quantities noted on Drawings are for the convenience of Contractor only and do not limit Contractor to those specific quantities. Furnish the quantities as may be necessary to do specific Work.

## 3.2 PALM TREE PLANTING

A. Pit Excavation:

1. Palm pits shall be staked prior to excavation with location of center point of palm trunk location approved by Engineer. Contractor shall provide a minimum of 72 hours notice to Engineer for approval process.

2. Excavate palm tree pits with vertical sides at a size that is twice the diameter of the rootball and at least 12 inches below rootball. Do not plant palm trees below their original grade line.

B. Palm Tree Pit Percolation Testing:

1. Fill each palm tree pit with water 72 hours prior to planting palm trees. If water has not drained by more than 95 percent within 24 hours, do not plant palm trees. Bring the slow drainage condition to the attention of Engineer immediately.

2. If such conditions are incurred, either dig a substitute plant pit or install a drainage sump in palm tree pit. Substitute plant pits are responsibility of Contractor. Incorporation of drainage sumps shall be considered as a Change of Work and shall be paid for in conformance with GENERAL CONDITIONS Section.

3. Submit written results of each palm tree pit percolation test containing location, date, and time of test to Engineer.

4. If rock or other underground obstructions are encountered in excavation of palm tree pits, acceptable alternate locations may be used at the option of Engineer. Cost for digging alternate palm tree pits shall be at Contractor's sole cost and expense and at no additional cost to Department.

C. Palm Tree Installation:

1. Obtain Engineer's approval prior to beginning palm tree planting.

2. Upon arrival of palm trees to Project Site, plant palm trees immediately or store palm trees for no more than 2 days in a shaded area. Keep palm trees misted with irrigation on an on-going basis. If palm trees are stored for more than 1 day, cover rootballs with burlap tarping and keep tarp moist.

3. Carefully unload palm trees with choker set on outside of palm trunk to allow palm to rotate when palm is lifted. Use only nylon or fabric chokers a minimum of 4 inches in width. Chains, wire, or cable shall not be permitted.

4. Scarring of palm tree trunk caused by inappropriate handling by Contractor may result in rejection of palm tree by Engineer and shall be replaced at Contractor's sole cost and expense at no additional cost to Department.

5. During off-loading, ensure that crane operator and choker-setter pay careful attention so that palm tree heads are not caught, dragged, rolled, pulled, or shaken, which may cause potential damage to palm tree bud.

6. Prepare properly sized palm tree pits and verify that pits meet percolation test review by Engineer before installing palm trees.

7. Prior to placing palm tree in palm tree pit, tamp and moisten bottom of pit. Set palm tree plumb and hold rigidly in position until backfill sand has been wet-tamped firmly around rootball. Continuously adjust palm tree to ensure a plumb and securely planted palm tree. Water-jet backfill mix as required to remove air pockets.

8. Form a 4-inch high circular watering basin slightly larger than the planting hole for palm tree. Make the bottom of the basin at finish grade or slightly lower.

9. Provide adequate staking of palm tree during palm establishment period. Obtain approval of Engineer for intended method of staking palm trees.

10. Do not use excess soil generated from excavating palm tree pits in backfill mix or in establishing final grade.

11. Protect planting areas from excessive vehicle compaction when craning palm trees to final planting site.

D. Palm Irrigation During Planting:

1. Closely monitor water intake to palm trees to ensure adequate water is being provided to palm trees continually.

2. It is critical that palm trees receive a plentiful supply of water during palm establishment period.

3. Minimize excess irrigation where possible. Adjust irrigation controller time as necessary to provide ideal amount of water to palm trees.

3.3 PALM CARE

A. Frond Pruning:

1. Exercise extreme care when pruning palm tree fronds. Trim green or partially green palm tree fronds or remove if they have been damaged from installation. Trimming of green palm fronds within first 3 years of establishment may diminish palm tree's resources to adequately establish itself.

2. If palm tree frond pruning is necessary, dip pruning tools in a 50 percent bleach, 50 percent water solution before beginning pruning operations and before moving from one palm tree to the next.

B. Fertilizing:

1. Apply specified palm tree fertilizer 45 days after planting palm trees.

C. Untying Fronds:

1. Cut palm tree frond ties when palm tree begins to push new frond growth.

2. Untie palm tree frond ties 45 to 60 days after planting during the months of June through September and 90 days during other months.

3. Coordinate cutting of palm tree frond ties with Engineer and the palm tree pathologist prior to cutting.

D. Frond Spraying:

1. After 14 Calendar Days, and then monthly after palm tree installation, foliar drench palm tree fronds with specified foliage drench materials.

3.4 INSPECTION TUBE INSTALLATION

A. As specified in PLANTING AND LANDSCAPING Section.

3.5 APPLICATION OF PRE-EMERGENT HERBICIDES

A. As specified in PLANTING AND LANDSCAPING Section.

## 3.6 FIELD QUALITY CONTROL

A. Engineer shall perform the following required inspections:

1. Condition of soil preparation, grading, surface drainage, and related underground utility Works prior to planting palm trees.

2. Tree pits prior to backfill and installation.

3. Palm trees at their source prior to delivery to Project Site or elsewhere as may otherwise be directed by Engineer.

4. Palm trees at time of delivery to Project Site.

5. Palm trees at the commencement of Plant Establishment, Maintenance, and Site Care Period.

6. Palm trees at the end of Plant Establishment, Maintenance, and Site Care Period.

7. Engineer may reject palm trees not conforming to requirements specified in this Section. Trees may be considered defective and shall be marked as rejected. Ensure that replacement trees are of same size, species, and condition as trees originally specified.

B. Notify Engineer at least 48 hours prior to the time of required inspections listed in Paragraph A of Inspection Article.

C. Notify Engineer 7 Calendar Days prior to the time of final inspection.

D. Palm trees shall be subject to inspection and approval of Engineer at the nursery, growing grounds, and upon delivery to Project Site for conformity with Specifications. Such approval shall not impair the right of further inspection and rejection during progress of Work.

## 3.7 PLANT ESTABLISHMENT AND MAINTENANCE

A. Refer to PLANT ESTABLISHMENT, MAINTENANCE, AND SITE CARE Section for additional requirements.

END OF SECTION

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Soil markers to mark the location of electrical conduits, water lines, sewer lines, storm drains, gas lines, telephone lines, and other conduits and lines.

1.2 RELATED SECTIONS

A. Section 33 10 01 - Water Distribution

B. Section 33 30 00 - Sanitary Sewerage

C. Section 33 40 01 - Storm Drainage

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the corresponding bid item of the Bid Proposal Line Items.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Soil markers shall fade resistant, temperature and UV stable, rugged, and flexible Model SM700U as manufactured by Berntsen.

B. Soil markers shall be 7 inch round top and 13 inch stake with anchor barb.

C. Soil marker shall be labeled as indicated on Drawings or may be the standard from the manufacturer for that utility.

D. Soil marker color and legend combination shall be in conformance with American Public Works Association (APWA) color coding or local requirements. Color codes are as follows:

1. Red: Electric power, distribution, and transmission installations or municipal electric installations.

2. Yellow: Gas distribution, oil distribution, petroleum, or installations containing dangerous materials, products or steam.

3. Orange: Telephone, telegraph installations, police and fire communications installations, and cable television.

4. Blue: Water installations and slurry pipelines.

5. Green: Sewer and storm drain installations.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install soil marker directly above the buried line.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Warning tape to mark the location of electrical conduits, water lines, sewer lines, storm drains, gas lines, telephone lines, and other conduits and lines

1.2 RELATED SECTIONS

A. Section 33 10 01 - Water Distribution

B. Section 33 30 00 - Sanitary Sewerage

C. Section 33 40 01 - Storm Drainage

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under each corresponding bid item of Bid Proposal Line Items that requires underground utility warning tape.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Warning tape shall be acid, alkaline, and corrosion resistant detectable marking tape Terra Tape Sentry Line as manufactured by Reef Industries, Incorporated, Houston, Texas, (800) 231-6074 or equivalent product as manufactured by T. Christy Enterprises, (800) 258-4583.

B. Warning tape shall be 6 inches wide by 5 to 6 mils thick. The tape shall be made of 1 layer of metalized foil laminated between 2 layers of inert plastic film.

C. Tape shall bear a continuous printed message to conform to the utility within the trench the tape is being installed in. The message shall be as indicated on Drawings or as may be the standard from the manufacturer for that utility.

D. Tape color and legend combination shall be in conformance with American Public Works Association (APWA) color coding or local requirements. Color codes are as follows:

1. Red: Electric power, distribution, and transmission installations or municipal electric installations.

2. Yellow: Gas distribution, oil distribution, petroleum, or installations containing dangerous materials, products or steam.

3. Orange: Telephone, telegraph installations, police and fire communications installations, and cable television.

4. Blue: Water installations and slurry pipelines.

5. Green: Sewer and storm drain installations.

6. Purple: Reclaimed water.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Where crushed miscellaneous base is used in the pavement structural section, install tape a minimum of 12 inches below bottom of the base material parallel and directly above the buried line unless indicated to be deeper on Drawings.

B. Where cement-sand slurry is used as backfill directly under asphalt concrete, place tape on top of slurry material parallel to and directly above the buried line unless indicated to be deeper on Drawings.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Domestic water distribution systems

B. Fire suppression water service shall be in conformance with City of Los Angeles Department of Water and Power (LADWP) Water Distribution Division Design Standards and Installation Requirements (DSIR) for Contractors available at: https://www.ladwp.com/engineering-standards-manual-and-standard-specifications

## 1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 09 90 01 - Painting for Exterior Improvements

C. Section 09 96 20 - Corrosion Control

D. Section 31 50 01 - Excavation Safety Requirements

E. Section 32 12 17 - Asphalt Concrete Paving

F. Section 32 13 14 - Concrete for Exterior Improvements

G. Section 33 05 97.23 - Underground Utility Warning Tape

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section in accordance with Drawing No. 1-3302A W Sheets shall be paid under the Water Distribution System bid item of Bid Proposal Line Items.

2. Payment for Work of this Section in accordance with Drawing No. 1-3302A DW Sheets shall be paid under the DWP Water Distribution System bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

C. ASTM B88 - Standard Specification for Seamless Copper Water Tube.

D. AWWA C104/A21.4 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.

E. AWWA C110/A21.10 - Ductile-Iron and Gray-Iron Fittings.

F. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

G. AWWA C115/A21.15 - Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.

H. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast.

I. AWWA C511 - Reduced-Pressure Principle Backflow Prevention Assembly.

J. AWWA C600 - Installation of Ductile-Iron Mains and Their Appurtenances.

K. AWWA C651 - Disinfecting Water Mains.

L. Reference Specifications (RS):

Section 209 - Pressure Pipe

Subsection 209-1 - Iron Pipe and Fittings

Section 306 - Open Trench Conduit Construction

M. Standard Plan - City of Los Angeles Department of Public Works:

S-251-1 - Pipe Laying in Trenches

1.5 SUBMITTALS

A. Submit to Engineer the following:

1. Complete materials list including pipe, position indicators, backflow preventers, valves, valve boxes, fittings, thrust blocks, anchor devices, joints, fire hydrants, and appurtenances.

2. Copy of certified statements from the pipe and fitting manufacturers that the pipes and fittings are cement lined and satisfy the referenced standards.

3. Copy of the disinfection test reports.

4. Proposed schedule detailing the line segments to be tested, the methods of isolating the testing from the rest of the system, the schematic diagram of the system for pressurizing monitoring techniques showing the hydrostatic test pump, the safety relief valves, and any other equipment used for the test.

5. A test report of pressure tests on piping and equipment shall be forwarded in duplicate to Engineer. This report shall show date of test, lines tested, length of time the test pressure was held, pressure drop or rise, volume leakage, and extent of venting or repressuring.

6. As-built drawings showing the coordinates and elevations of underground tees, bends, crosses, valves, plugs, and caps.

7. Backflow preventer assemblies shall be tested in conformance with County of Los Angeles Department of Public Health requirements. Backflow Prevention Device Field Testing and Maintenance Report shall be forwarded in duplicate to Engineer. Electronic file of the report can be found at: www.publichealth.lacounty.gov/eh/docs/permit/backflow-prevention-device-testing-monitoring.pdf.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Pipes:

1. Store pipe in stock piles built on a flat base.

2. Keep rubber gaskets from excessive heat and free from oil and grease.

B. Store fittings, hydrants, and valves on wooden platforms above ground.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials shall be approved by City of Los Angeles Department of Building and Safety, City of Los Angeles Fire Department, Factory Mutual (FM) approved, and UL listed.

B. Pipes, pipe fittings or fixtures, solder or flux intended to convey or dispense water for human consumption shall be lead-free in conformance with State of California Health and Safety Code, Section 116875 and Section 94.604.10 of City of Los Angeles Plumbing Code. Pipe, pipe fittings or fixtures, solder or flux shall be certified by a testing laboratory recognized by City of Los Angeles Department of Building and Safety (LADBS) for testing in conformance with the referenced Code Section.

2.2 PIPING

A. Ductile iron shall be in conformance with RS Subsection 209-1.1.

B. Copper pipe shall be hard pipe in conformance with ASTM B88.

1. Pipes 3 inch in diameter and smaller shall be Type “K”.

C. Fittings:

1. Fittings 1/2 inch to 3 inch in diameter shall be wrought copper or cast red bronze, close grained, and nonporous. Cast fittings permitted only in sizes and type not available in wrought fittings.

2. Fittings 4 inch in diameter and larger shall be ductile-iron in conformance with AWWA C110/A21.10 and double cement mortar lined in conformance with AWWA C104/A21.4.

D. Joints:

1. Underground Installation: Pipes 4 inch in diameter and larger shall have push-on joints, unless indicated otherwise on Drawings.

2. Above Ground Installation: Pipe fittings and joints 4 inch in diameter and larger shall be flanged in conformance with AWWA C110/A21.10.

3. Provide restraining glands at change in directions and where mechanical joints are used or as indicated on Drawings.

4. Restraining glands for mechanical joints shall be Megalug Series 1100 and Megalug Bell Restraint Harness Series 1700 for push-on joints, as manufactured by EBAA Iron, Inc., (800) 433-1716.

5. Flange adaptor shall be Megaflange Restrained Flange Adapter Series 2100 with bolts, nuts, and gasket, as manufactured by EBAA Iron, Inc.

6. Flexible expansion joints shall be double ball flanged, Flex-Tend, as manufactured by EBAA Iron, Inc.

7. Nuts and bolts shall be coated with Trenton wax-tape primer available from Farwest Corrosion Control Company, (888) 532-7937.

2.3 VALVES AND APPURTENANCES

A. Valves shall be right hand turn in closing direction.

B. Backflow preventer shall conform to AWWA C511, and shall be reduced pressure type, Wilkins Model 375XL for 1/2 inch to 2 inch and Wilkins Model 375 for 2 1/2 inch to 10 inch. The 10 inch model shall have a maximum head loss of 12.00 psi at 2,300 gallons per minute (gpm).

C. Backflow preventer shall conform to AWWA C511, and shall be reduced pressure type, Wilkins Model 500XL3 for 1/2 inch to 2 inch and Wilkins Model 375 for 2 1/2 inch to 10 inch. The 10 inch model shall have a maximum head loss of 12.00 psi at 2,300 gallons per minute (gpm).

D. Valve box shall be Model No. 3-H assembly with cast-iron hinged cover as manufactured by Brooks Products.

2.4 CORROSION CONTROL

A. Paint the above ground water system in conformance with PAINTING FOR EXTERIOR IMPROVEMENTS Section with color as follows:

1. Fire suppression water distribution: Fire Engine Red

2. Domestic water distribution: OSHA Blue

B. Apply modified aluminum epoxy mastic in conformance with CORROSION CONTROL Section to underground metals not otherwise protected against corrosion.

2.5 BEDDING MATERIALS

A. Pipe bedding shall be Case I bedding in accordance with Standard Plan S-251-1 with a Type A (sand or gravel) bedding material unless shown otherwise on Drawings.

2.6 MASONRY BLOCK SUPPORTS

A. Masonry block supports for services shall be as detailed on Drawings.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Construct water distribution system after grading and compacting of the surrounding areas to the top of the rough grade elevation has been completed.

B. Install in conformance with the requirements of City of Los Angeles Department of Building and Safety, City of Los Angeles Fire Department, AWWA C600, and RS Subsection 306-8.2. The existing water system shall be maintained in service until new service has been activated, except for making connections. Coordinate any fire protection system shutdowns with City of Los Angeles Fire Department, Department's insurance agent – FM Global, Department Construction and Maintenance Division, Port Police, affected tenants, and Engineer. Shut downs shall be limited to the minimal time required to complete connections to existing systems.

C. Coordinate installation of backflow preventers with the installation of meters by City of Los Angeles Department of Water and Power (LADWP).

D. Protect excavations and trenches against caving-in by shoring or otherwise in conformance with EXCAVATION SAFETY REQUIREMENTS Section.

E. Thrust Blocks:

1. Thrust blocks, restraining, and anchorage devices that change in direction shall be approved by Engineer for size and detail wherever such details are not shown on Drawings.

2. Perform concrete Work in accordance with the details shown on Drawings or approved shop drawings and conform with the requirements of CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

F. Backfilling shall be in conformance with TRENCHING AND BACKFILLING Section.

G. Depth of Cover:

1. Where no profile information is shown on Drawings, the minimum cover on pipes 16 inches in diameter or smaller shall be 4 feet measured from top of pipe to finished grade. In the event of local interference or adjustments to meet existing pipe elevations, permission may be granted by Engineer to drop below these elevations to avoid the obstruction.

2. Realigning piping (to avoid localized interference and to meet grade of existing piping, where the resultant depth of cover in localized areas does not exceed 24 inches below the specified depth), shall be done at Contractor's sole cost and expense. Deflection in piping at any one joint resulting from grade change shall not exceed recommendation of pipe manufacturer.

H. Install underground utility warning tape as specified in UNDERGROUND UTILITY WARNING TAPE Section.

I. Paint in conformance with PAINTING FOR EXTERIOR IMPROVEMENTS Section.

1. Paint fire hydrants safety yellow.

J. Furnish to Engineer an accurate table of each buried valve showing manufacturer’s name, model number, size, stations, elevations, and number of turns from fully opened to totally closed position.

3.2 CLEANING AND DISINFECTING

A. Prior to installation, clean piping interior by wire brush or other means to remove scale, sand, cutting chips, and the like. Remove loose material by compressed air. After construction and prior to testing, flush piping with clean water to remove construction debris.

B. Disinfect that portion of the water distribution systems installed in Project, including any existing waterlines, if necessary, at either end of the system back to the first available valves. Conform to AWWA C651 for disinfecting water mains. Furnish and install and remove upon completion of testing, blind flanges, valves, pressure connections, and chlorination inlet point(s) required to test and chlorinate the water distribution system. Arrange for sampling and testing of the new water system with a certified testing laboratory and submit test results to Engineer in compliance with AWWA C651.

## 3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. General:

a. Prior to backfilling waterline trenches, test new sections of the water distribution system in conformance with RS Subsection 306-7.8.2.1 (g) and the requirements of City of Los Angeles Plumbing Code, except that the water lines shall be hydrostatically pressure tested at 200 pounds per square inch gage (psig), in the presence of City of Los Angeles Plumbing Inspector and Engineer.

2. Reduced pressure backflow devices shall not be pressure tested.

3. Maximum allowable leakage shall be in conformance with RS Subsection 306-8.9.2.3.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Sanitary sewer system

## 1.2 RELATED SECTIONS

A. Section 31 00 00 - Earthwork

B. Section 33 05 97.23 - Underground Utility Warning Tape

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Sanitary Sewerage System bid item of Bid Proposal Line Items.

## 1.4 REFERENCES

A. City of Los Angeles Department of Public Works Standard Plan:

S-251-1 - Pipe Laying in Trenches

B. Reference Specifications (RS):

Section 207 - Gravity Pipe

Subsection 207-8 - Vitrified Clay Pipe (VCP)

Section 209 - Pressure Pipe

Subsection 209-1 - Iron Pipe and Fittings

Section 306 - Open Trench Conduit Construction

Subsection 306-1 - General

# PART 2 - PRODUCTS

## 2.1 MATERIALS

A. Sanitary sewer shall be cast-iron pipe in conformance with RS Subsection 209-1.

B. Sanitary sewer shall be vitrified clay pipe in conformance with RS Subsection 207-8.

2.2 BEDDING MATERIALS

A. Bedding materials shall be in accordance with Standard Plan S-251-1.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Trench excavation, bedding, pipe installation, backfill, densification, and testing shall be in accordance with Standard Plan S-251-1, Case I bedding and RS Subsection 306-1, unless shown otherwise on Drawings.

B. Backfill shall be compacted to 90 percent relative density except for the top 12 inches of backfill which shall be compacted to 95 percent relative density.

C. Install underground utility warning tape as specified in UNDERGROUND UTILITY WARNING TAPE Section.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Obtain inspection by City of Los Angeles Department of Building and Safety and Engineer of installations prior to concealment and completion of Work.

2. The sanitary sewer shall be pressure tested in conformance with RS Subsection 306-7.8.

3. Prior to start of Work, Contractor shall conduct a closed circuit television (CCTV) inspection of the existing sewer or structure where connections are to be made to document the existing condition.

4. Contractor shall also perform a post-installation CCTV inspection of the sewer after backfill of the trench and before completion of trench resurfacing, to determine if Work was completed in conformance with Contract Documents.

5. CCTV equipment shall include television cameras, a television monitor, cables, power sources, and other equipment. Focal distance shall be adjustable through a range from 6 inches to infinity. The remote-reading footage counter shall be accurate to less than one percent error over the length of the particular section of pipeline being inspected. This distance shall be measured from the centerline of the upstream maintenance hole to the centerline of the downstream maintenance hole. The camera and television monitor shall produce a minimum 350 lines per inch resolution. The inspection shall be performed using a remote-focus stationary lens camera, a rotating-lens camera or a pan-and-tilt camera, which shall be mounted on a skid, floatable raft system, or transporter based on the conditions of the pipeline to be televised.

6. The pipeline shall be CCTV inspected during optimum low-flow level conditions. CCTV inspection camera shall be moved through the pipeline in a downstream direction at a uniform rate no greater than 30 feet per minute, stopping when necessary to ensure proper documentation of the sewer's condition.

7. Documentation shall consist of a colored digital recording, log sheets, and written report detailing the post installation condition of the pipeline and lateral connections or openings. The report and digital recording shall note the time and date of CCTV inspection, street name or sewer line identification, upstream and downstream maintenance hole stations, direction of view, direction of flow, pipe size, pipe material, and footage station or counter.

8. Video inspections shall be recorded on a digital storage device. Original digital recordings, log sheets, and reports shall be submitted to Engineer for review and acceptance of Work, and shall become property of Harbor Department.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Storm drainage materials and accessories

B. Bedding for pipes

1.2 RELATED SECTIONS

A. Section 31 23 19 - Dewatering

B. Section 31 50 01 - Excavation Safety Requirements

C. Section 32 13 14 - Concrete for Exterior Improvements

D. Section 33 05 97.23 - Underground Utility Warning Tape

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Storm Drainage System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. Reference Specifications (RS):

Section 207 - Gravity Pipe

Subsection 207-2 - Reinforced Concrete Pipe (RCP)

Subsection 207-18 - Annular, High-Density Polyethylene Pipe with Smooth Interior, Corrugated Exterior, with Bell and Spigot Joints (Type S)

Section 208 - Pipe Joint Types and Materials

Subsection 208-3 - Gaskets For Concrete Pipe

Section 217 - Bedding and Backfill Materials

Subsection 217-1 - Bedding Material

Section 306 - Open Trench Conduit Construction

Subsection 306-6 - Bedding

B. Standard Plan – City of Los Angeles Department of Public Works, Bureau of Engineering:

S-111-0 - House Connection Remodeling

S-241-0 - Reinforced Concrete Pipe

S-251-1 - Pipe Laying in Trenches

S-253-0 - Supports for Storm Drain and Sewer Pipes Across Trenches

S-255-1 - Blanket Protection for Pipes

S-281-3 - Maintenance Hole Frame and Cover 24-Inch

S-300-1 - Junction Structure "A"

S-312-1 - Pavement Remodeling at Catch Basins

S-320-0 - Sidewalk Outlet Structure

S-322-2 - Sidewalk Culvert with Steel Plate Top

S-330-0 - Concrete Collar for Storm Drain Pipe

S-331-1 - Monolithic Connection

S-341-0 - Catch Basin Reinforcement

S-349-2 - Catch Basin Protection Bar and Support

S-351-1 - Side Opening Catch Basins

S-372-1 - Transition Structure "C"

S-381-0 - Manhole "EZ"

S-791-1 - Advance Construction Notice Signs

C. Standard Plan – City of Los Angeles Harbor Department:

H-101-01 - Catch Basin – Grate – Frame

D. Standard Plans for Public Works Construction (SPPWC):

SPPWC 300-3 - Curb Opening Catch Basin

SPPWC 302-3 - Curb Opening Catch Basin with Grating(s)

SPPWC 303-3 - Curbside Grating Catch Basin

SPPWC 310-3 - Catch Basin Face Plate Assembly and Protection Bar

SPPWC 312-4 - Catch Basin Manhole Frame and Cover

SPPWC 313-3 - Local Depressions at Catch Basins

SPPWC 320-2 - Manhole Pipe-to-Pipe Main Line ID=36" (900 mm) or Larger

SPPWC 321-2 - Manhole Pipe-to-Pipe (One or Both Main Line ID's 33" (825mm) or Smaller)

SPPWC 322-2 - Manhole Pipe-to-Pipe (Large Side Inlet)

SPPWC 324-2 - Manhole Shaft with Eccentric Reducer

SPPWC 331-3 - Junction Structure - Pipe to Pipe Inlet ID = 24" (600 mm) or OD > 1/2 Main Line ID

SPPWC 332-2 - Junction Structure - Pipe to Pipe ID = 24" (600 mm)

SPPWC 333-2 - Junction Structure - Pipe to RCB

SPPWC 335-2 - Pipe Connections to Existing Storm Drains

SPPWC 340-2 - Transition Structure Pipe to Pipe

SPPWC 342-2 - Transition Structure RCB to Pipe

SPPWC 380-4 - Concrete Collar for RCB 12" (300 mm) through 72" (1800 mm)

SPPWC 630-4 - 24" (610 mm) Manhole Frame and Cover

SPPWC 635-3 - Steel Step

SPPWC 636-2 - Polypropylene Plastic Step

1.5 SUBMITTALS

A. One-cubic foot samples of proposed bedding materials for approval prior to use.

B. Pipeline layout diagram in conformance with RS Subsection 207-2.1.

C. Shop drawings and calculations for storm drain castings and fabrications signed by a civil engineer registered in State of California.

D. Detail for concrete pipe joint in conformance with RS Subsection 207-2.5.

E. Material manufacturer's certificate of compliance with Specifications.

F. Shop drawings indicating layout of trench drain system with connections and accessories.

G. Original digital recordings of closed circuit television inspections, log sheets, and reports for review and acceptance of Work, which shall become property of Department.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cast-in-place concrete materials shall conform to the applicable requirements of CONCRETE FOR EXTERIOR IMPROVEMENTS Section and as specified in this Section. Cement shall be Type II.

B. Bedding shall conform to RS Subsection 217-1, Standard Plan S-251-1, and as called for on Drawings.

C. Reinforced concrete pipe shall conform to RS Subsection 207-2.

D. Joints shall be rubber-gasketed type conforming to RS Subsection 208-3.

E. Upon encountering groundwater in trench excavation zone, refer to Drawings and TRENCHING AND BACKFILLING Section for additional trench subgrade stabilization requirements.

F. High density polyethylene (HDPE) pipe shall be in conformance with RS Subsection 207-18. Perforation of HDPE pipe, where required on Drawings, shall be in conformance with American Association of State Highway and Transportation Officials (AASHTO) Class II Perforation.

G. Catch basin screens and filters shall be as noted on Drawings.

H. Materials shall be from a City of Los Angeles Department of Public Works Bureau of Engineering pre-approved manufacturer or supplier.

I. Sidewalk culverts shall be in accordance with Standard Plan S-322-2.

## 2.2 FABRICATIONS AND CASTINGS

A. Grates shall conform with Department Standard Plan H-101-01 incorporating any changes that may be shown on Drawings. Design grates for 125,000 pounds wheel loading.

B. Maintenance hole covers shall conform with Standard Plan S-281-3, with "L.A.H.D." and "SD" lettering, except that covers shall be adequate for 125,000 pounds wheel loading.

## 2.3 TRENCH DRAIN AND SLOT DRAIN

A. Trench and Slot drain systems shall be a modular system of precast polymer-concrete channel sections, grates, and appurtenances; designed so grates fit into channel recesses without rocking or rattling. System shall be ACO 'KS100S", manufactured by ACO Polymer Products, Inc.

B. System design shall meet Class C Loading requirements. Include number of units required to form total lengths indicated.

C. Channel Sections: Interlocking-joint, precast, modular units with end caps. Include 4 inch inside width and deep, rounded bottom, with built-in invert slope of 0.6 percent and with outlets in number, sizes, and locations indicated. Include extenstion sections necessary for required depth.

D. Frame: Include stainless steel frame for grate.

E. Trench Drain Grates shall be ADA compliant, stainless steel Heavy Duty Model 430D.

F. Provide ACO Vertical Outlet Strainer, at the outlet end of each trench drain.

G. Slot Drain Grate shall be ACO "KS100 Brickslot 100 Heel Resistant" with a custom neck height to receive adjacent paving.

H. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.

I. Provide KS900 in-line catch basin with trash bucket at the outlet end of each trench drain with pipe connection. Addionally, provide at least one access unit per run of BrickSlot drain and a minimum, one access unit per every 150 linear feet of slot drain.

J. Supports, Anchors, and Setting Devices shall be manufacturer's standard unless otherwise indicated. Channell-Section Joining and Fastening Materials shall be as recommended by system manufacturer.

2.4 AREA DRAINS

A. PVC surface drain inlets shall be 8"-30" Drain Basins manufactured by Nyloplast (866) 888-8479. Inlets shall include drain basin and ductile iron grates supplied by the same manufacturer.

B. Area drain structure diameter shall be minimum size required to hydraulically connect inlet and outlet pipes.

C. Drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system. Joint tightness shall conform to ASTM D3212 for joints for drain and sewer plastic pipe using flexible elastomeric seals. Seals shall conform to ASTM F477.

D. Grates shall be ductile iron, sized to match the drain body. Ductile iron castings shall conform to ASTM A536 grade 90-50-05. Area Drains shall be capable of supporting H-10 vehicular loading in paved areas. Grate shall meet ADA standards for accessibility when in paved areas. Grates in biowales shall be beehive-type.

2.5 FRENCH DRAIN

A. French drain stone shall be double washed AASHTO #57 Stone.

B. Filter fabric shall be Mirafi 140N as manufactured by TenCate.

2.6 CLEANOUT

A. Cleanouts shall be heavy weight cast iron plug and pipe from finished grade to three feet below finished grade. Plug shall have countersunk head. When in paving, cleanout system shall be rated for H-10 conditions.

PART 3 - EXECUTION

3.1 EXCAVATION AND BACKFILL

A. Excavation and backfill for drainage structures shall be in conformance with TRENCHING AND BACKFILLING Section.

B. Perform trench excavation to the depths shown on Drawings or as necessary for installation. Install pipes and other precast materials without dewatering (in the wet). Groundwater can be anticipated at plus 3 to plus 4 feet elevation in backland areas and at or near tidal elevation adjacent to the rock dikes. If Contractor chooses to dewater, it shall be at no additional cost to Department. Refer to DEWATERING Section for requirements.

3.2 INSTALLATION

A. Construct and install underground structures in conformance with RS Section 306.

B. Bedding Material and Drainage Structure Bases:

1. Bedding shall conform to RS Subsection 306-6 and Standard Plan S-251-1. Case shall be as shown on Drawings.

2. Compact bedding material to 95 percent relative density.

C. Structures:

1. Place and cure cast-in-place concrete structures in conformance with CONCRETE FOR EXTERIOR IMPROVEMENTS Section.

D. Trench drain construction shall be as shown on approved manufacturer's details and Drawings. A minimum of 6 inches of concrete shall be placed around the forms. Trench drain walls and floor shall be a monolithic concrete pour. No cold joints, keyways, or water stops shall be constructed between 6 inches below concrete floor and walls.

E. Metal Castings and Grates:

1. Set frames, grates, and covers to the finish elevations shown on Drawings.

F. Install underground utility warning tape as specified in UNDERGROUND UTILITY WARNING TAPE Section.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Department Testing Laboratory (Test Lab) shall perform bedding compaction tests 1 time at no expense to Contractor. Retests because of failed tests shall be performed by Department and at sole cost and expense of Contractor. Allow time for tests to be run and results returned.

2. Prior to start of Work, Contractor shall conduct a closed circuit television (CCTV) inspection of the existing storm drain or structure where connections are to be made to document the existing condition.

3. Contractor shall also perform a post-installation CCTV inspection of the storm drain after backfill of the trench and before completion of trench resurfacing, to determine if Work was completed in conformance with Contract Documents.

4. CCTV equipment shall include television cameras, a television monitor, cables, power sources, and other equipment. Focal distance shall be adjustable through a range from 6 inches to infinity. The remote-reading footage counter shall be accurate to less than 1 percent error over the length of the particular section pipeline being inspected. This distance shall be measured from the centerline of the upstream maintenance hole to the centerline of the downstream maintenance hole. The camera and television monitor shall produce a minimum 350 lines per inch resolution. The inspection shall be performed using a remote-focus stationary lens camera, a rotating-lens camera or a pan-and-tilt camera, which shall be mounted on a skid, floatable raft system, or transporter based on the conditions of the pipeline to be televised.

5. The pipeline shall be CCTV inspected during optimum low-flow level conditions. CCTV inspection camera shall be moved through the pipeline in a downstream direction at a uniform rate no greater than 30 feet per minute, stopping when necessary to ensure proper documentation of the storm drain’s condition.

6. Documentation shall consist of a colored digital recording, log sheets, and written report detailing the post installation condition of the pipeline and lateral connections or openings. The report and digital recording shall note the time and date of CCTV inspection, street name or storm drain line identification, upstream and downstream maintenance hole stations, direction of view, direction of flow, pipe size, pipe material, and footage station or counter.

7. Record video inspections on a digital storage device.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Traffic signal facilities

## 1.2 RELATED SECTIONS

A. Section 34 41 14 - Traffic Control

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. The quantity of traffic signals (exclusive of B-permit Work) to be paid for shall be measured on a lump sum installed in place.

2. Payment shall include full compensation for furnishing transportation, labor, materials, tools, and equipment, and for doing Work involved in traffic signals (exclusive of B-Permit Work), as shown on Drawings, as specified in this section, and as directed by Engineer. Payment for traffic signals (exclusive of B-Permit Work) shall be paid under the Traffic Signal (exclusive of B-Permit Work) bid item of Bid Proposal Line Items.

## 1.4 SUBMITTALS

A. Submit the following to Engineer:

1. Manufacturer's product data.

2. Working Drawings showing construction and Shop Drawings showing details of equipment, foundations, connections, and pull boxes.

3. Test results.

4. As-Built Plans: Submit to Engineer and City of Los Angeles Department of Transportation (LADOT) within 10 working days after implementing traffic signal installations, removals, and modifications, signed and dated by Contractor. As-Built plan shall include field changes from elements shown on Drawings, including conduit size and location, overhead and underground conductor runs and schedules, traffic signal equipment and location , and other traffic control devices such as signs, striping, delineators, and barricades. Field changes may be documented on Current Status submittals of As -Built Traffic Signal Plans in a reproductive-redline format, and shall be submitted only after obtaining LADOT Traffic Signal Inspector's signature verifying the current status.

1.5 QUALITY ASSURANCE

A. In conformance with current edition of Reference Specifications, as modified by Standard Plan S-61O (Brown Book) and current LADOT Special Provisions and Standard Drawings for Installation and Modification of Traffic Signals, and Caltrans Standard Plans and Specifications.

1. Contractor Qualifications - Experienced in construction and maintenance of traffic signals and systems.

2. Notify Engineer and LADOT 10 working days before starting traffic signal Work for requirements, coordination, and inspection services.

1.6 PROJECT SITE CONDITIONS

A. Coordinate in conformance with Reference Specifications, Brown Book, and LADOT Special Provisions, and Standard Drawings for Installation and Modification of Traffic Signals. Protect and maintain pedestrian traffic from open excavations and pullboxes using barricades, delineators, and construction tape, and other approved methods. Protect and maintain vehicular traffic traveling adjacent to Project Site. Conform traffic control measure to approved detour plans, including traffic signal shutdowns, Project Site set-up, and hours of operation. Refer to TRAFFIC CONTROL Section, for additional requirements when working within areas open to public traffic.

1.7 AUTOMATED TRAFFIC SURVEILLANCE AND CONTROL SYSTEM (ATSAC)

A. Work specified in this Section consists of furnishing and installing conduits, pull boxes, traffic signal pole, foundation, and loop detectors while protecting existing utilities and LADOT's Automated Traffic Surveillance and Control (ATSAC) facilities.

B. For Work in an ATSAC Project area, a field meeting shall be scheduled with ATSAC Project Engineer 3 working days prior to the beginning of construction. Full restoration of ATSAC system must occur within 5 working days after shut down.

C. Damage to ATSAC facilities shall be repaired or replaced at no additional cost to Department.

1.8 COORDINATION

A. Coordinate Work through Engineer with Work of other contractors and utiiities to effectively control traffic through Work zone. Make available to Department and City of Los Angeles, construction progress and projected sequence schedules and reports. Confirm schedule, sequence, and operation with Engineer and LADOT before installing, removing, and modifying traffic signal equipment to minimize conflicts with other contractors working adjacent to Project Site.

PART 2 - PRODUCTS

2.1 MATERIALS

A. In conformance with Reference Specifications, Brown Book, and LADOT Special Provisions and Standard Drawings for Installation and Modification of Traffic Signals, and Caltrans Standard Plans and Specifications.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install traffic signals in conformance with Reference Specifications, Brown Book, LADOT Special Provisions and Standard Drawings for Installation and Modification of Traffic Signals, and Caltrans Standard Plans and Specifications. Notify Engineer and LADOT Signal Inspector and provide signal construction schedule 3 working days before start of signal Work.

3.2 TESTING

A. Perform final testing of system in conformance with RS Subsection 701-18. Test shall be witnessed by Engineer and LADOT Signal Inspector. Record results and submit to Engineer and LADOT for review and approval.

## 3.3 LOOP INSTALLATION

A. Install pre-formed inductive traffic signal loops before portland cement concrete street paving Work. Contact LADOT for confirmation of exact loops locations 10 working days before loop installation.

## 3.4 TRAFFIC SIGNAL WORK COMPLETION

A. Complete traffic signal Work for its concurrent operation with the completion of striping and pavement marking installation and modification. Complete "restoration" traffic signal Work for its concurrent operation with mark-out of final traffic striping.

## 3.5 FIELD VERIFICATION

A. Verify field conditions before implementing traffic signal plans. Coordinate through Engineer and with LADOT if field conditions are different. At which time a revised signal plan may be provided by Engineer for implementation.

## 3.6 PROTECTION

A. Protect and maintain existing traffic signal facilities in place. Existing interconnect cable per traffic signal plan on Harry Bridges Boulevard and North Access Road interfering with construction may be relocated only with prior approval by LADOT. Maintain traffic signal detector loops in operation at all times, and replace traffic signal detectors loops immediately, when damaged by construction. In the event of damage to traffic signal facilities, immediately notify LADOT inspector at (213) 485-6689, and immediately repair or replace damaged facilities at no additional cost to Department. Repaired or replaced traffic signal facilities shall be inspected by LADOT inspector before signal circuits are energized.

END OF SECTION

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

A. Traffic control equipment

B. Temporary traffic signal hardware including temporary traffic striping, pavement markings, and signs

C. Certified flaggers

D. Protection of vehicular and pedestrian traffic on the streets and sidewalks adjacent to Project Site affected by construction

E. Ensure unimpeded access to buildings adjacent to Project Site

F. Ensure compliance with the detour plans as approved by Engineer and approved by Los Angeles Department of Transportation (LADOT).

G. Prepare and obtain approvals, for additional detour plans that are not shown by Engineer and LADOT pre-approved drawings.

H. Drawings include Project Site Traffic Control Plans (WTCP) approved by Engineer and approved by LADOT for this Contract. Should Contractor choose to modify the pre-approved detour plans or implement alternative detour plans, such modification or alternative plan shall be implemented only with the prior written approval of Engineer and approval by LADOT.

## 1.2 RELATED SECTIONS

A. Section 01 14 19 - Site Conditions

B. Section 34 41 13 - Traffic Signals

## 1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. The quantity of Project Site traffic control to be paid for shall be measured on a lump sum installed in place.

2. Payment shall include full compensation for furnishing transportation, labor, materials, tools, and equipment, and for doing work involved in worksite traffic control, as shown on Drawings, as specified in these specifications, and as directed by Engineer. Payment for Project Site traffic control shall be paid under Worksite Traffic Control bid item of Bid Proposal Line Items.

3. Shall be paid under the Traffic Signage bid item of Bid Proposal Line Items.

1.4 DEFINITIONS

A. Sidewalk: A walkway that is entirely within street curb and property line section of the public right-of-way.

1.5 SUBMITTALS

A. Additional detour plans or modifications to the pre-approved WTCP, or new detour plans not shown in pre-approved WTCP - Prepare and submit to Engineer and LADOT for approval, not less than 30 days prior to implementation. Prepare under direction of a traffic engineer or civil engineer registered in State of California and experienced in preparation of detour plans. Detour plans shall be signed by Contractor. Obtain written approval of Engineer and approval by LADOT prior to implementation. Preparation of a detour plan is required when:

1. Traffic is to be diverted to the left of centerline delineation (double yellow, dashed, or median channelization) for more than 1 night.

2. An existing permanent or detour traffic lane on any street is continuously obstructed for more than 4 days.

3. Work area is adjacent to an intersection and results in a transition within the intersection.

4. In other unusual situations where traffic and physical conditions, such as speed and restricted visibility, require special treatment.

5. Engineer and LADOT shall determine the need for, and extent of, changes to traffic control devices including traffic signals, traffic signs, parking meters, channelization, and striping removal and restriping.

B. Accompany additional or modified detour plans with submittal describing proposed locations and time durations; include the following:

1. Pedestrian and public vehicular traffic routing.
2. Traffic blockage and lane restrictions and reductions expected to be caused by construction operations.
3. Allowable on-street parking within immediate vicinity of Project Site.
4. Access to building immediately adjacent to operations.
5. Driveways and alternative access when driveway shall be blocked by construction operations.
6. Temporary traffic control devices. Temporary pavement striping and marking of streets and sidewalks affected by construction.
7. Temporary commercial and industrial loading and unloading zones.
8. Modifications to street lighting locations and operation as shown on Street Lighting Plans.
9. Modifications to traffic signal locations and operation in conformance with LADOT approved temporary signal plan.
10. Construction vehicle routes, hauling hours, staging, locations, and number and size of vehicles involved to be approved by Bureau of Engineering, City of Los Angeles.

C. Submit lane and sidewalk closure plans before starting Work. Obtain written approval of plans from Engineer and approval by LADOT before implementation. Show and describe proposed location, dates, hours, and duration of closure, vehicular and pedestrian traffic routing and management, traffic control devices for implementing pedestrian and vehicular movement around closures, and details of barricade locations.

D. Haul route plans and disposal site location, number of trucks, grading, excavation and erosion permit for approval by Engineer. Obtain haul route permits from City of Los Angeles.

E. Notify, in writing, 14 days in advance, individual owners, owner's agents, and tenants of buildings adjacent to Project Site before impairing access to those buildings and use of adjacent public ways or prohibiting stopping and parking of vehicles. Before restricting pedestrian and vehicular access to properties affected by this Contract, obtain written acceptance of pedestrian circulation and driveway access plan from Engineer, and approval by LADOT.

F. Manufacturer's product data.

1.6 QUALITY ASSURANCE

A. Refer to TRAFFIC SIGNALS Section for traffic signal materials, equipment, and installation.

B. Designate a qualified person, approved by Engineer and LADOT, to inspect and test traffic control devices daily and to ascertain devices are continuously operational, serviceable, in-place, and clean. Provide daily inspection reports to Engineer and LADOT upon request.

C. Assign qualified persons who have successfully completed "Safety through Maintenance and Construction Zones" course administered through Institute of Transportation Studies, University of California, Berkeley, California to be responsible for maintenance, implementation, and inspection of traffic control. Submit to Engineer and LADOT certification verifying the satisfactory completion of course Work.

D. Employ a C31 licensed contractor who specializes in traffic control, approved by Engineer, to be responsible for installation, 24 hour continual maintenance, and removal of traffic control and detour devices, as indicated in traffic circulation plan.

E. Notify LADOT 10 working days prior to implementing the detour plans for requirements, coordination, and inspection services.

## PART 2 - PRODUCTS

### 2.1 TRAFFIC CONTROL DEVICES

A. Devices shown on WTCP, and other detour plans include reflectorized signs, traffic signals, delineators, striping, barriers, barricades, K-rails, guard rails, crash cushions, high-level warning devices, and portable changeable message signs (PCMS) conforming to the latest edition of California Manual of Uniform Traffic Control Devices (CA MUTCD) issued by State of California Department of Transportation (Caltrans). Provide material and products in conformance with Reference Specifications, as adopted and as modified by City of Los Angeles Brown Book, and Caltrans Standard Specifications and Standard Plans. Conflicts among above documents to be resolved by LADOT and Engineer. Additional sign specifications are as follows:

1. Other warning, directional, or informational signs of professional quality on 0.5-inch minimum thickness exterior plywood. Do not make signs with crayons, markings pens, or spray cans. Lettering shall be uniform in height. Fabricate reflectorized signs using materials of super engineering grade or higher standard for use during night-time closures.

2. Maintain signs graffiti-free and immediately replace if damaged or vandalized.

3. Install signs in conformance with LADOT standards.

### 2.2 TRAFFIC SIGNAL EQUIPMENT

A. Equipment removed during demolition and Project Site clearing Work shall be handled as specified on traffic signal plans and in conformance with TRAFFIC SIGNALS Section .

## PART 3 - EXECUTION

### 3.1 WORK AREA TRAFFIC CONTROL PRACTICES

A. Conform to CA MUTCD and LADOT Standard Plans and approved detour plans (WTCP) for Project as accepted by Engineer and approved by LADOT.

## 3.2 TEMPORARY TRAFFIC CONTROL DEVICES

A. Place temporary traffic control devices at the locations specified in WTCP whlch shall enable traffic to traverse area without hazard or abrupt changes in direction. Place delineators (28 inch cone with 13 inch reflective sleeve for night-time use) in accordance with approved detour plans. Operate warning lights between sunset and sunrise. Place control devices to alert approaching traffic to hazards and variances to normal traffic patterns. Place flashing arrow signs where motorists' visibility of existing warning devices, traffic signals, and pedestrians crosswalks would not be limited or obscured or as called for on Drawings. Place barricades, delineators, and similar protective devices where personnel and equipment shall be working within 5 feet of edge of a lane bearing traffic. Clean and repair damaged devices or replace with new devices as required or as directed by Engineer or LADOT. Remove devices when no longer required.

B. Place PCMS at the location specified in WTCP and shall be furnished, placed, operated, and maintained as designated by Engineer in conformance with Caltrans Standard Specifications.

## 3.3 TEMPORARY TRAFFIC STRIPING AND PAVEMENT MARKINGS

A. Stripe and mark pavement before diverting traffic in accordance with approved detour plans. Remove permanent or conflicting striping and pavement markings by sandblasting or other permanent methods approved by Engineer and LADOT. Covering of striping with black paint is not an acceptable method of striping removal. Double coat the striping at the time of original installation and during subsequent repainting. Repaint detour and non-detour striping in traffic control zone within 15 days, upon receiving a written request from Engineer, or LADOT, or as necessary, when determined, as hazardous traffic conditions. Spray reflective beads over the paint by mechanical means at the time of striping installation. Refer to LADOT specifications for bead sizes. Maintain striping and marking until installation of permanent traffic marking and striping, or when temporary condition is no longer required. Remove temporary striping and marking by sandblasting or LADOT approved methods when no longer required.

## 3.4 FLAGGERS

A. Furnish and use flaggers as specified in approved detour plans, LADOT Standard Plans, and CA MUTCD. Furnish flaggers where construction equipment may intermittently encroach on traffic lanes, unprotected sidewalks and crosswalks, and where construction operations would affect public safety and convenience. In addition to reflectorized vests and paddles, provide additional lighting for night-time operation conforming to CA MUTCD.

## 3.5 CONSTRUCTION VEHICULAR TRAFFIC

A. Restrict hauling vehicles to approved haul routes and staging areas and hours of hauling operation.

## 3.6 MAINTAINING VEHICULAR AND PEDESTRIAN FLOW ADJACENT TO WORKSITE

A. Ensure construction operations shall not impede normal traffic.

## 3.7 SIGNS

A. Contractor shall supply and install signage at specified locations as shown in WTCP and install signs with attachments conforming to LADOT standard and approval of LADOT field engineer.

1. Furnish and install necessary advance detour or guidance signing as specified in detour plans.

2. Furnish and install regulatory vehicle turn restriction signs, as specified in detour plans.

3. Implement traffic control modifications outside of traffic control zone which are necessary to manage diverted traffic in conformance with WTCP .

## 3.8 HAUL ROUTE PLAN

A. Post a copy of haul route plan permit approved by City of Los Angeles, at Project Site and in each Contract haul vehicle having a gross weight exceeding 10,000 pounds. Provide copies to the hauling subcontractors.

## 3.9 TRAFFIC CONTROL OFFICERS

A. If determined necessary by LADOT, traffic control officers shall be provided by LADOT.

## 3.10 STORAGE OF CONSTRUCTION MATERIAL AND EQUIPMENT

A. Do not store construction material or equipment outside designated Project Site as indicated in WTCP.

B. Do not store construction material or equipment, within designated Project Site, more than 5 days. Special exemptions for materials or equipment may be granted by Engineer or LADOT upon receiving a written request justifying use and for the specific time period required.

C. Do not store construction material or equipment, within designated Project Site, higher than 4 feet. Special exemptions for equipment may be granted by Engineer and LADOT upon receiving a written request justifying the equipment use and for the specific time period required.

D. Do not store construction material and equipment in manner that would create visibility obstructions to the motorists, or visibility of pedestrians in the walkway from the roadway.

## 3.11 CONSTRUCTION DURATION

A. Restrict traffic lane requirements to time durations as specified on WTCP. Submit written request to Engineer and LADOT specifying need to extend Work beyond accepted time duration. Obtain LADOT and Engineer’s written approval for time extensions.

## 3.12 PLATING

A. Allow the use of steel plates for specified time durations based on the following conditions: (according to WATCH Manual and City of Los Angeles Standard Plan S-610 (Brown Book), SSPWC Current Edition 7-1-10). Feather exposed edges with cold mix.

1. Use non-skid coating on steel plates (coefficient of friction equal to 0.6) located within pedestrian walkways or vehicular travel paths.

2. Cover lift holes on steel plates located in pedestrians areas.

3. Warn the motorist public of the existence of steel plates using advance warning signs.

4. Anchor or pin steel to the roadway.

5. Tack weld the plates together if a series of plates are placed side by side.

END OF SECTION

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Removal, storage, and reinstallation of existing street light standards and installation of new standards including electroliers, luminaires, and ballasts as indicated on Drawings.

B. Installation of temporary street and sidewalk lighting facilities to maintain lighting illumination level equal to existing system on temporary street lighting circuits, and installation of necessary facilities to maintain circuit continuity on adjacent circuits affected by Project.

C. Furnishing, installing, connecting, and testing light standards, luminaires, anchor bolts, conduits, wires, and accessories as required, for a complete operational system.

D. Coordination of installation of new conduits, foundations, pull boxes, wire, and adjustment of existing facilities where required, with Engineer, City of Los Angeles, Bureau of Street Lighting (BSL) and Department of Water and Power, Power System (DWPPS) as necessary for reestablishing permanent street lighting electrical circuits.

E. Repairing street lighting systems damaged as a result of the execution of Contract, and maintaining affected circuits operational.

### 1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. The quantity of street lighting (exclusive of B-Permit Work) to be paid for shall be measured on a lump sum installed in place.

2. Payment shall include full compensation for furnishing transportation, labor, materials, tools, and equipment, and for doing Work involved in street lighting (exclusive of B-Permit Work), as shown on Drawings, as specified in this Section, and as directed by Engineer. Payment for street lighting (exclusive of B-Permit Work) shall be paid under the Street Lighting bid item of Bid Proposal Line Items.

### 1.3 REFERENCES

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

B. ASTM B776 - Standard Specification for Hafnium and Hafnium Alloy Strip, Sheet, and Plate.

C. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.

D. NFPA 70 - National Electrical Code.

E. Reference Specifications (RS):

Section 310 - Painting

Subsection 310-1 - General

Subsection 310-2 - Surface Preparation for Painting Steel Structures

Subsection 310-5 - Painting Various Surfaces

Section 700 - Street Lighting and Traffic Signal Systems

Subsection 700-3.9 - Bonding and Grounding

1.4 SUBMITTALS

A. Submit the following to Engineer:

1. Manufacturer's product data.

2. Drawings showing construction and shop drawings showing mounting details of electroliers, foundations, luminaries, connections, and pull boxes.

3. Plans and drawings showing temporary street lighting facilities to be approved by Engineer and City of Los Angeles, Bureau of Street Lighting (BSL) signed by a civil or electrical engineer registered in State of California. Include temporary sidewalk lighting plans.

4. Shop drawings and calculations prepared under direction of and sealed by a civil or electrical engineer registered in State of California.

5. Bill of materials of components, cross referenced to approved Shop Drawings.

6. The name, address, and telephone number of licensed electrical contractor familiar with, and able to perform, high-voltage street lighting Work to be contracted for emergency repair Work.

7. Red-line as-built plans of temporary changes to street light circuits shall be submitted to Engineer and BSL within 10 days of making change. As built plans of permanent Work shall be submitted in conformance with PROJECT RECORD DOCUMENTS Section.

1.5 QUALITY ASSURANCE

A. Provide products for, and the execution of Work of this Section that shall satisfy the requirements of NFPA 70, Occupational Safety and Health Administration (OSHA), California Code of Regulations, and Standard Specifications for Public Works Construction (SSPWC) and supplements, as modified by City Standard Plan, S-610 (Brown Book), Los Angeles Bureau of Street Lighting Special Specifications for Construction of Street Lighting Systems, Caltrans Standard Plans and Specifications, Department standards, and jurisdictional codes.

1.6 PROJECT CONDITIONS

A. Coordination: Adjacent street lights may be required to remain in operation; utility services shall be required to remain operational.

B. Give 48 hours of notice to Engineer, City of Los Angeles Department of Water and Power - Power Supply (DWPPS) or Bureau of Street Lighting (BSL), Field Operations Division prior to Work on existing series circuits.

C. Give written notice, 72 hours in advance of removal of existing street lighting system, to Engineer and BSL.

D. If DWPPS cannot provide temporary street lighting service, then wire installation of temporary street lighting facilities to existing lighting service. Obtain approval for temporary electrical service from Engineer, City of Los Angeles Bureau of Contract Administration, and DWPPS.

PART 2- PRODUCTS

2.1 ELECTROLIER

A. A new standard fixture, where indicated, conforming to appropriate Caltrans Standard plans and Specifications or Special Specifications for Construction of Street Lighting Systems, 2009 Edition, published by Bureau of Street Lighting, Department of Public Works, City of Los Angeles; match existing units or as indicated on Drawings.

2.2 BALLASTS AND PULL BOXES

A. Conform to Special Specifications for Construction of Street Lighting or Caltrans Standard plans and Specifications as appropriate.

2.3 ANCHOR BOLTS

A. Provide type and size indicated. Anchor bolts shall be in conformance with ASTM F3125/F3125M, with 2 nuts and 2 washers each. Anchor bolts, nuts, and washers. Hot-dip galvanized in conformance with ASTM A153/A153M or cadmium plated, Type NS conforming to ASTM B776.

2.4 GROUND RODS

A. Copper clad steel rods, 0.75-inch diameter by 10 feet long, with drive heads. Conductor-to-rod connectors shall be sized for ground conductor.

2.5 WIRES, CABLES, AND CONDUIT

A. Conform to SSPWC, Caltrans Standards and Specifications, and Division 26 of these Specifications.

2.6 LUMINAIRES

A. As listed on Material List on Drawings.

2.7 LAMPS

A. As listed on Material List on Drawings and BSL Directive No. 404.

PART 3 - EXECUTION

3.1 DEMOLITION, STORAGE, AND REMOVAL

A. Carefully remove and store existing electroliers for reuse as indicated on Drawings.

B. Scheduling:

1. Schedule Work with consideration for use of street lighting in public and adjacent areas.

2. Avoid interference with use of, and passage to and from, adjacent areas.

C. Remove wire in concealed conduit to be abandoned in place. Fit conduit with self-threading connectors and caps.

D. Abandoned materials and equipment items indicated to be removed and not indicated to be salvaged or reused. Demolish, remove, dismount, or disconnect in a manner to ensure no damage shall result to other adjacent items or surfaces to remain.

E. Remove, store, and reset street light poles and fixtures. Store street light poles and fixtures until reinstallation during restoration of street.

F. Carefully disassemble multi-piece lighting standards, consisting of base casting, shaft, arm brackets, and reinforcing pipe components, by removing parts form top as necessary. Remove parts except reinforcing pipe before foundation removal. Remove reinforcing pipe as a single component.

G. Storage requirements for street light standards and fixtures:

1. Remove fixtures from standards.

2. Store streetlight standards horizontally; tilt for proper drainage. Do not allow water to collect on, or in poles.

3. Separate streetlight standards from each other with lumber; handle separately to avoid them touching each other.

4. Use web slings or heavy rope to hoist standard; avoid scouring concrete and metal surface of poles and parts. Do not use chains or wire rope.

5. Store luminaries and ballasts under cover, protected from weather; prevent entry and accumulation of water and dirt.

6. Label removed equipment that is to be reinstalled as indicated at a specific designated location.

## 3.2 INSTALLATION

A. Install standards, fixtures, ballasts, and foundations in conformance with manufacturer's written instructions and conforming to Reference. Specifications, City of Los Angeles Brown Book, Special Specifications for Construction of Street Lighting Systems, published by BSL, and Caltrans Standards and Specification. Notify Underground Service Alert (USA) of Southern California at least 3 workings days before start of excavation to mark utilities at (800) 422-4133. Notify non-member utilities to mark their facility separately.

## 3.3 TESTING

A. Testing shall be in conformance with Reference Specifications. Tests shall be witnessed by Engineer/SSL - Contract Administration inspector as appropriate.

## 3.4 INSPECTION AND REPLACEMENT

A. Immediately before final inspection, examine installed products. Remove blemished and damaged products and replace with new products at no additional costs to Department. Do not reuse lamps.

## 3.5 CLEANING AND PAINTING

A. Clean street lighting standards affected by Project other than unpainted galvanized in conformance with RS Subsections 310-2.1, 310-2.2, and 310-2.3.

B. Repaint street lighting standards in accordance with RS Subsection 310-1, and 310-5.1.1, except premier coating shall not be required where base metal is not exposed. Finish coating shall be Department of Water and Power streetlight gray as designated by the appropriate governing agency.

C. Clean street lighting optical reflective and refractive glassware and hardware components of special lantern equipment and streetlight luminaries specified to be reused before reinstallation.

## 3.6 GROUND RODS

A. Install in conformance with RS Subsection 700-3.9.

## 3.7 RESTORATION

A. Refinish, repair, or replace existing items and surfaces to remain, damaged as a result of Work, to satisfaction of Engineer at no additional cost to Department.

## 3.8 EMERGENCY REPAIRS

A. Repair damage to street lighting system resulting from Work. Maintain affected circuits in operation. Submit the name, address, and telephone number of the licensed electrical contractor who is able to perform Work on high-voltage street lighting facilities. The electrical contractor shall be on-call on a 24-hour basis to make immediate emergency repairs, at no additional cost to Department.

B. Obtain electrical safety clearances from DWPPS upon 24-hour advance notice, before performing Work on street light circuits.

1. Daytime - Call (213) 481-4366.

2. After 4:00 pm and weekends - Call (800) 821-5278

C. Provide qualified stand-by electrical subcontractor to undertake street lighting, or traffic signal repairs. Notify Engineer, Bureau of Contract Administration at (213) 485-3002, and Bureau of Street Lighting Field Operations Division at (213) 913-4743, whenever stand-by subcontractor is called upon to do repair Work.

## 3.9 TEMPORARY STREET LIGHTING FACILITIES

A. Temporary street lighting is required as a part of Project. Number of temporary units installed and the spacing between adjacent locations: Match the existing street lighting system in service on a one for one basis. Temporary street lights shall be in place and operational before removal of existing street lights.

B. Maintenance and operation of temporary street lighting system shall be Contractor's responsibility. Do not use generators for temporary street lighting.

C. Operate temporary street lighting system from sunset to sunrise. Restore streetlights out of service within 24 hours. Match existing illumination levels.

D. Temporary Street Lighting Luminaires: 200 watts high pressured sodium (HPS), 120 Volt, alternating current single phase, 60 hertz, mounted 30 feet minimum above street utilizing wood or steel lighting standards. Luminairess, ballasts, and lamps: Conform to Bureau of Street Lighting System current edition, with latest revisions. Light distribution patterns: Illuminating Engineering Society (IES)/American National Standards Institute (ANSI) medium semi-cutoff Type JI.

E. Temporary Streetlights: Served by two wire No. 8 AWG or larger conductor with electrical service exclusively for street lighting use by Department of Water and Power with provisions for emergency access by DWPPS, and by Bureau of Street Lighting, or by Engineer.

## 3.10 TEMPORARY SIDEWALK LIGHTING FACILITIES

A. Temporary Sidewalk Lighting: Required as part of Project and required on public pedestrian walkways or sidewalks within area of Contractor operations and within City dedicated right-of-way open to nighttime public use.

B. Do not use generators for Contractor's temporary sidewalk lighting.

C. Operate temporary sidewalk lighting between sunset and sunrise. Restore sidewalk lights out of service within 24 hours.

D. Temporary sidewalk lighting fixtures: 70 watt high pressure sodium, 120 Volt alternating current, single phase 60 hertz, vandal-proof. Space intervals: Approximately equal, except install a sidewalk fixture at each change of direction in sidewalk. Minimum mounting height: 10 feet above sidewalk; do not install fixtures at a height exceeding 20 feet without written approval of Engineer.

E. Temporary street lighting installed on roadways may be used to illuminate temporary sidewalks in cases where sidewalks are directly adjacent to roadway lighting facilities and no barrier, protective or otherwise over 4 feet in height, is installed between temporary streetlight and sidewalk to be illuminated

F. Temporary sidewalks lighting facilities may be installed on sidewalk structure walls or on overhead surfaces as approved by Engineer.

## 3.11 COORDINATION OF CONDUITS

A. Coordinate the location and placement of final conduits to avoid conflict with planned curb side trees and other plantings.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Flexible vehicle delineators

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the corresponding Lump Sum Construction bid items of Bid Proposal Line Items.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Model No. TD5200 Series: White, 2-1/4 inch round, and 42 inches high. WCT Products, 13309 Beach Avenue, Marina del Rey, California, Phone: 800-928-7763.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Place flexible vehicle delineators in conformance with manufacturer’s written instructions.

B. Placement connections and anchorage of the flexible vehicle delineators shall be in accordance with Drawings or as directed by Engineer.

END OF SECTION

# APPENDIX "A"

# PROJECT LABOR AGREEMENT (PLA) AND POLA CONSTRUCTION CAREERS POLICY

Harbor Department
Agreement 17-3520
City of Los Angeles

# CITY OF LOS ANGELES

**Harbor Department**

THE PORT
OF LOS ANGELES

2017-2027

## Project Labor Agreement (PLA)

***WITH***

LOS ANGELES/ORANGE COUNTIES
BUILDING AND CONSTRUCTION TRADES COUNCIL
Affiliated with the Building & Construction Trades Department (AFL/CIO)
Craft International Unions and any other craft labor Unions signatory to this Agreement

PROJECT LABOR AGREEMENT
CITY OF LOS ANGELES HARBOR DEPARTMENT

## TABLE OF CONTENTS


Introduction and Findings ..... 2
I. Definitions ..... 5
II. Scope of Agreement ..... 10
III. Effect of Agreement ..... 14
IV. Work Stoppages, Strikes, Sympathy Strikes and Lockouts ..... 15
V. No Discrimination ..... 22
VI. Union Security ..... 22
VII. Referral ..... 23
VIII. Wages and Benefits ..... 32
IX. Employee Grievance Procedure ..... 34
X. Department Policies And Procedures ..... 34
XI. Compliance ..... 35
XII. Joint Administrative Committee ..... 36
XIII. Grievance Arbitration Procedure ..... 37
XIV. Jurisdictional Disputes ..... 40
XV. Management Rights ..... 41
XVI. Safety, Protection of Person and Property ..... 43
XVII. Savings Clause ..... 44
XVIII. Steward ..... 45
XIX. Term ..... 46

Attachment "A" - Letter of Assent
Attachment "B" – Los Angeles/Orange Counties Building and Construction Trades Council Approved Drug and Alcohol Testing Policy
Attachment "C" - Craft Request Form
Attachment "D" - Trade Union Contact Numbers
Attachment "E" – Five-Year Capital Improvement Program ("CIP") Project List

Harbor Department
Agreement 17-3526
City of Los Angeles

**PROJECT LABOR AGREEMENT**
**CITY OF LOS ANGELES**

**HARBOR DEPARTMENT**

**INTRODUCTION AND FINDINGS**

The purpose of this Project Labor Agreement ("Agreement") is to promote efficiency of construction operations during the construction of various projects within the Harbor Department's Capital Improvement Program (CIP) and provide for the orderly settlement of labor disputes and grievances without strikes or lockouts, thereby promoting the public interest in assuring timely and economical completion of these Projects.

WHEREAS, the Port of Los Angeles is among the world's premier ports and is a critical hub for global trade; and

WHEREAS, the Port of Los Angeles is the nation's busiest container port, and the Port's 7,500 acres, 43 miles of waterfront, 270 berths and 26 cargo terminals represent a critical segment of the U.S. trade infrastructure and the global supply chain; and

WHEREAS, in addition to containerized cargo, the Port's diverse maritime operations handle bulk products, scrap metal, steel, and cruise passengers, with regularly scheduled vessel calls increasing the need for more terminal acreage and more efficient operations, as well as transforming the Port into a model environmental-friendly gateway through the implementation of the San Pedro Bay Ports Clean Air Action Plan; and

WHEREAS, the Harbor Department is responsible for construction, renovation, maintenance and operation of the facilities and infrastructure of the Port of Los Angeles, including capital improvement projects throughout the Port; and

WHEREAS, the safe, timely and successful completion of these projects with a trained workforce is of utmost importance to the Harbor Department and the general public in the City; and

WHEREAS, the work to be done will require maximum cooperation from the many Parties who will be involved; and

WHEREAS, it is recognized that projects of a certain magnitude with multiple contractors and bargaining units on the job site at the same time over an extended period of time create the potential for work disruption without there being an overriding commitment to maintain continuity of work; and

WHEREAS, the interests of the Harbor Department, the general public, the City, the Unions, contractors, subcontractors, employers and workers would be best served if the construction work proceeded in an orderly manner free of disruption because of strikes, sympathy strikes, work stoppages, picketing, lockout, slowdowns or other interferences with work; and

WHEREAS, large numbers of workers of various skills will be required in the performance of the construction work, including those to be represented by the Unions affiliated with the Los Angeles/Orange Counties Building and Construction Trades Council and any other craft labor organization which are signatory to this Agreement, employed by contractors and subcontractors who are signatory to agreements with said labor organizations; and

WHEREAS, the Contractor/Subcontractor/Employer(s) (C/S/E) and the Unions desire to mutually establish and stabilize wages, hours and working conditions for the workers employed on these Projects by the C/S/Es, and further, to encourage close cooperation among the C/S/Es, and the Unions to the end that a satisfactory, continuous and harmonious relationship will exist among the Parties to this Agreement; and

WHEREAS, this Agreement is not intended to replace, interfere with, abrogate, diminish, or modify existing local or national collective bargaining agreements in effect during the duration of this Agreement, insofar as a legally binding agreement exists between the C/S/Es and the affected Unions, except to the extent that the provisions of this Agreement are inconsistent with said collective bargaining agreements, in which event, the provisions of this Agreement shall prevail; and further, it is understood that C/S/Es are bound and shall remain bound, for the duration of this Agreement by the terms of this Agreement and applicable local and national collective bargaining agreements for the craft work performed, established between the signatory Unions and C/S/Es, in effect and covering the area of these Projects; and

WHEREAS, this Agreement is not intended to have an adverse impact on the policy of the City to maximize business opportunities for minority, women and other business enterprises in City contracts; and

WHEREAS, increasing access to employment opportunities with prevailing wages is one way for the Harbor Department to directly combat poverty and stimulate economic reinvestment; and

WHEREAS, the Harbor Department has adopted a departmental Agreement which will provide construction employment and training opportunities in ways calculated to mitigate the harms caused by poverty, unemployment and underemployment; and

WHEREAS, this Agreement reflects a commitment by all parties to the diversity in the workforce hiring that reflect levels of minority, women and other worker utilization at levels which are representative of the relevant workforce of these groups in the Greater Los Angeles Area as determined by the U.S. Census Bureau; and

WHEREAS, the contracts for the construction of Projects will be awarded in accordance with the applicable provisions of the Harbor Department's Administrative Policies and Procedures; and

WHEREAS, the Parties signatory to this Agreement pledge to work towards a mutually satisfactory completion of Projects;

NOW, THEREFORE, IT IS AGREED BETWEEN AND AMONG THE PARTIES HERETO, AS FOLLOWS:

## ARTICLE I

## DEFINITIONS

**1.1** "Agreement" means this Project Labor Agreement and its applicability to all Projects.

**1.2** "Apprentice" means any worker who is indentured in a bona fide Labor/Management construction apprenticeship program, registered and approved by the State of California Department of Industrial Relations (DIR) Division of Apprenticeship Standards (DAS) or in the case of Projects with federal funding,

indentured in a bona fide Labor/Management construction apprenticeship program, approved by the US Department of Labor (DOL) and California DAS.

**1.3** "Apprenticeship Program" means any Labor/Management construction apprenticeship program certified and approved by the California Division of Apprenticeship Standards (DAS) or in the case of Projects with federal funding, approved by the US DOL and California DAS.

**1.4** "Awarding Authority" means the City of Los Angeles, acting by and through the Board of Harbor Commissioners, or any employee or officer of the Board that is authorized to award or enter into any contract on behalf of the Board.

**1.5** "Board" means the Los Angeles Board of Harbor Commissioners.

**1.6** "Bureau of Contract Administration" (BCA) means the designated bureau within the City's Department of Public Works which may provide support services to the Harbor Department in administering this Agreement.

**1.7** "City" means the City of Los Angeles, a municipal corporation, and all City awarding authorities.

**1.8** "Committee" means the Joint Administrative Committee as described in Article XII of this Agreement.

**1.9** "Construction contract" means a City contract which has been awarded by the Board, and is necessary to complete the Harbor Department Project.

**1.10** "Contractor/Subcontractor/Employer(s)" (C/S/E) means any individual firm, partnership, owner operator, or corporation, or combination thereof, including joint ventures, which is an independent business enterprise and has entered into a contract with the Harbor Department or any of its contractors or subcontractors/owner operators

of any tier, with respect to the construction of any part of the Project(s) under contract terms and conditions approved by the Board and which incorporate this Agreement.

**1.11** "Core Worker" means a verifiable member of a C/S/E's core workforce for the purpose of this Agreement if the worker's name appears on the C/S/E's active payroll for 60 of 100 working days immediately prior to the award of the construction contract and meets all standards required by applicable local, state or federal law or regulation.

**1.12** "Covered Project(s)" or "Project" means a project or projects which have been included within the Ten-Year Capital Improvement Program ("CIP") Project List and covered by this Agreement or so designated by the Board. The Board may identify additional projects that are appropriate for coverage by the Agreement for inclusion under the CIP and include such projects by Board Resolution. The Board shall request an annual review of the Harbor Department Capital Improvement Program to identify any new projects appropriate for inclusion with in the CIP.

**1.13** "Department" means the Harbor Department of the City of Los Angeles.

**1.14** "Employment Hiring Plan" (EHP) means a C/S/E's detailed hiring plan as described in BCA's Targeted Hiring Guidelines for Contractors and the Policy or other applicable Department policy.

**1.15** "Engineer" means the Chief Harbor Engineer of the City of Los Angeles Harbor Department, Construction Division, or its authorized representative.

**1.16** "FHWA Project" means a Harbor Department Project that is funded in whole or in part by the Federal Highway Administration (FHWA).

**1.17** "Ten year (10) Capital Improvement Program ("CIP") Project List" means the list of Harbor Department projects included as Attachment E hereto that will operate under

the Harbor Department PLA, as well as other projects that may be added in the sole discretion of the Department.

**1.18** "Jobs Coordinator" means the Prime Contractor's designated person, agent or agency that will facilitate the local hire referral process with the C/S/E, Unions and other referral organization, as described in the Construction Careers Policy. The Jobs Coordinator must be able to demonstrate or document to the Department or its designee that it has the requisite qualification and/or experience to fulfill the duties and responsibilities as outlined in the Policy.

**1.19** "LA/OCBTC" (Trades Council) means the Los Angeles/Orange Counties Building and Construction Trades Council.

**1.20** "Letter of Assent" means the document that each C/S/E (of any tier) must sign and submit to the Engineer or designated administrator, which formally binds them to adherence to all the forms, requirements and conditions of this Agreement and Policy.

**1.21** "Local Resident" means an individual whose primary residence is within the Tier 1 or 2 zip code areas.

**1.22** "Long-Term Unemployment" as defined by the Bureau of Labor Statistics means being jobless for 21 weeks or more, or as defined.

**1.23** "Plan" means the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry as referenced in Article XIV of this Agreement.

**1.24** "Policy" means the Harbor Department Construction Careers Policy.

**1.25** "Subscription Agreement" means the contract between a C/S/E and a Union's Labor/Management Trust Fund(s) that allows the C/S/E to make the appropriate fringe benefit contributions in accordance with the terms of the contract.

**1.26** "Targeted Hiring Guidelines for Contractors" means the document provided by the Department to assist C/S/E's in implementing the targeted hiring procedures.

**1.27** "Tier 1" means the zip codes identified in Article 7.4 of the PLA, which fall within an approximate ten mile radius of the Port and in which the rate of unemployment is in excess of 105% of the County of Los Angeles' unemployment rate at the time of application and/or are within the area of Port-related operations and activity and/or are within the area of Port-related operations and activity.

**1.28** "Tier 2" means the zip codes within the City, identified in Article 7.5 of this Agreement, that includes at least 2 census tracts (or a portion thereof) in which the median annual household income is less than $62,627 per and/or where the rate of unemployment is in excess of 100% of the County of Los Angeles' unemployment rate at the time of application.

**1.29** "Transitional Worker" means any individual whose primary place of residence is within a Tier 1 or Tier 2 zip code of the City of Los Angeles, and who prior to commencing work on a Project has been certified as satisfying at least one of the following criteria:

(1) having Veteran status; having a documented history of involvement with the criminal justice system; being homeless; or,

(2) is an individual facing two or more of the following barriers to employment: having a household income less than 50% of the Los Angeles County median annual household income, receiving public assistance, lacking a GED or high school diploma, being a custodial single parent, suffering from long term unemployment, being emancipated from the foster care system, or being an apprentice, in a program

described in Section 1.3 above, with less than 15% of the apprenticeship hours required to graduate to journey level.

(3) If the Jobs Coordinator or Employer is not able to identify anyone using criteria (1), criteria (2) may be used.

**1.30** "Union(s)" or "Signatory Unions" means the Los Angeles/Orange Counties Building and Construction Trades Council affiliated with the Building & Construction Trades Department (AFL/CIO) Craft International Unions or any other craft labor organization signatory to this Agreement, acting in their own behalf and on behalf of their respective affiliates and member organizations whose names are subscribed hereto and who have through their officers executed this Agreement.

## ARTICLE II

## SCOPE OF AGREEMENT

**2.1** Parties: The Agreement shall apply and is limited to all C/S/Es performing construction on a Harbor Department Project, the Board, and the Unions (signatory Unions or otherwise).

**2.2** Project Description: The Agreement shall apply to all CIP construction contracts awarded by the Board. The Board has the absolute right to combine, consolidate or cancel contracts or portions of contracts identified as part of the Project. Should the Board remove any contract from the Project and thereafter authorize that construction work be commenced on the contract, the contract may, at the discretion of the Board, be performed under the terms of the Agreement.

**2.3** Project Labor Disputes: The provisions of this Agreement, including the Schedule A Agreements, (which are the local collective bargaining agreements of the signatory

Unions having jurisdiction over the work on the Project, as such may be changed from time-to-time and which are incorporated herein by reference) shall apply to the work covered by this Agreement. It is understood that this is a self-contained, stand alone Agreement and that by virtue of having become bound to this Agreement, neither the Prime Contractor, Employer, nor the Subcontractor (of any tier) or owner-operator will be obligated to sign any other local, area, or national agreement, except as may be provided under Section 8.2, below. It is further agreed that, where there is conflict, the terms and conditions of this Agreement shall supersede and override terms and conditions of any and all other national, area, or local collective bargaining agreements (Schedule A Agreements) except for all work performed under the NTL Articles of Agreement, the National Stack/Chimney Agreement, the National Cooling Tower Agreement, all instrument calibration work and loop checking shall be performed under the terms of the UA/IBEW Joint National Agreement for Instrument and control systems Technicians, and the National Agreement of the International Union of Elevator Constructors, with the exception of Article IV (Work Stoppages, Strikes, Sympathy Strikes and Lockouts), Article XIII (Grievance and Arbitration Procedure) and Article XIV (Jurisdictional Disputes) of this Agreement, which shall apply to such work. All disputes relating to the interpretation or application of this Agreement shall be subject to resolution by the grievance arbitration procedure set forth in Article XIII of this Agreement except for those disputes exempted from the grievance procedure pursuant to Article 13.1. Where a subject is covered by a provision in a Schedule A Agreement and not covered by this Agreement, the provision of the Schedule A Agreement shall prevail. Any dispute as to the applicable source between this Agreement and any

Schedule A Agreement for determining the wages, hours of working conditions of employees on a Project shall be resolved under the grievance procedures established in this Agreement.

**2.4** Exclusions:

(1) This Agreement shall be limited to construction work on a Project which is approved by the Board, and is not intended to, and shall not apply to any construction work performed at any time prior to the effective date, or after the expiration or termination of the Agreement, or on other City projects.

(2) This Agreement is not intended to, and shall not, affect or govern the award of contracts by the Board, which are outside the approved scope of the Project.

(3) This Agreement is not intended to, and shall not, affect the operation or maintenance of any facilities whether related or not to Projects.

(4) This Agreement shall not apply to a C/S/E's executives, managerial employees, engineering employees, supervisors (except those covered by Schedule A collective bargaining agreements), office and clerical employees, or any other employee not performing construction craftwork.

(5) Notwithstanding the foregoing, it is understood and agreed that Building/Construction Inspector and Field Soils and Material Testers (inspectors) are a covered craft under this Agreement. This inclusion applies to the scope of work defined in the State of California Wage Determination for that Craft. This shall not cover quality assurance work or material testing performed by or on behalf of the Department. Every Inspector performing under the wage classification of Building/Construction Inspector and Field Soils and Material Tester under a professional services agreement or a

construction contract shall be bound to all applicable requirements of this Agreement. Notwithstanding the provisions of this sub-section, the Department may engage consultants for limited periods of time in the event of an urgent need for specialized inspection services. The Department must provide prior notice to the Trades Council that despite good faith efforts, it is unable to obtain qualified inspector(s) under the provisions of this Agreement. Such engagement shall be only to meet immediate and limited needs until such qualified inspectors working under this Agreement are available.

(6) This Agreement shall not apply to material suppliers or delivery by any means of material, supplies, or equipment required to any point of delivery.

(7) This Agreement shall not apply to City employees.

(8) This Agreement shall not apply to the work of persons, firms and other entities that perform consulting, planning, scheduling, management or other supervisory services on the Project, provided such entities do not perform craft employee construction work on the Project with their own employees or to customer service work performed post completion by an entity other than the C/S/E that performed the original construction work.

(9) This Agreement shall not apply to Harbor Department construction contracts or Projects, if the federal funding source has established provisions or rules that forbid the inclusion of a Project Labor Agreement.

(10) FHWA Projects: All provisions of this Agreement shall apply to the project, in accord with the policies and conditions under which the FHWA funds are received from the U.S. Department of Transportation.

(11) Out-of-State Workers: Hours worked by residents of states other than California shall not be included in calculation of total hours of Project work for purposes of the percentage requirements set forth by the Agreement.

(12) Notwithstanding the foregoing, demolition and asbestos abatement shall constitute work covered by the Project Labor Agreement when such work is part of a Covered Project.

**2.5** The Harbor Department and/or the C/S/Es, as appropriate, have the absolute right to award contracts on this project to any C/S/E, notwithstanding the existence or non-existence of any agreements between such C/S/E and any Union parties, provided only that such C/S/E is ready, willing and able to execute and comply with this Agreement should such C/S/E be awarded work covered by this Agreement.

## ARTICLE III

## EFFECT OF AGREEMENT

**3.1** By executing the Agreement, the Unions and the Board agree to be bound by each and all of the provisions of the Agreement.

**3.2** By accepting the award of a construction contract for a Project, whether as a C/S/E, the C/S/E agrees to be bound by each and every provision of the Agreement.

**3.3** At the time that any C/S/E enters into a subcontract with any subcontractor of any tier providing for the performance on the construction contract, the C/S/E shall provide a copy of this Agreement to said subcontractor and shall require the subcontractor as a part of accepting the award of a construction subcontract to agree in writing in the form of a Letter of Assent to be bound by each and every provision of this Agreement prior to the commencement of work. See Attachment "A" for a sample

Letter of Assent.

(1) Approval of any C/S/E to perform work on the Project will be contingent upon the submittal of its Letter of Assent and its Employment Hiring Plan to the Chief Harbor Engineer and the Council.

**3.4** This Agreement shall only be binding on the signatory C/S/Es hereto and shall not apply to the parents, affiliates, subsidiaries, or other ventures of any construction contract prior to the execution of this Agreement.

## ARTICLE IV

## WORK STOPPAGES, STRIKES, SYMPATHY STRIKES AND LOCKOUTS

**4.1** The Unions, Board and C/S/Es agree:

(1) During the existence of this Agreement, there shall be no strike, sympathy strike, picketing, hand billing, slowdown, withholding of work, refusal to work, lockout, sick-out, walk-off, sit-down, stand-in, wobble, boycott, or other work stoppage, disruption, advising the public that a labor dispute exists, or other impairment of any kind for any reason by the Unions or employees employed on the Project, at the job site of the Project, or at any other facility of the City because of a dispute on this Project.

(2) As to employees employed on the Project, there shall be no lockout of any kind by any C/S/E(s) covered by the Agreement. The C/S/E(s) may lay off employees for lack of work or delay of work on the Project.

(3) The Unions agree that they shall not sanction in any way any picket line or other impairment of the work on the Project and will affirmatively take all measures necessary to effectively induce their respective members to cross any and all picket lines and report for work as scheduled and that responsible representatives of the

Unions who are employed on the Project will also do so themselves.

(4) The Unions agree that they shall not sanction, aid or abet, encourage or continue any work stoppage, strike, picketing or other disruptive activity at the Project site or C/S/E's business site that will economically and/or materially affect the completion of the Project. Any such costs that economically and/or materially harm the City shall be borne by the affected Union and made payable to the City.

(5) Notwithstanding any provision of this Agreement to the contrary, it shall not be a violation of this Agreement for any Union to withhold the services of its members (but not the right to picket) from a particular C/S/E who:

(i) fails to timely pay its weekly payroll; or

(ii) fails to make timely payments to the Union's Labor/Management Trust Funds in accordance with the provisions of the applicable Schedule A Agreements. Prior to withholding its members services for the C/S/E's failure to make timely payments to the Union's Labor/Management Trust Funds, the Union shall give at least ten (10) days (unless a lesser period of time is provided in the Union's Schedule A Agreement, but in no event less than forty-eight (48) hours) written notice of such failure to pay by registered or certified mail, return receipt requested, and by facsimile transmission to the involved contractor, the prime contractor, and the BCA. Union will meet within the ten (10) day period to attempt to resolve the dispute.

(iii) Upon the payment of the delinquent C/S/E of all monies due and then owing for wages and/or fringe benefit contributions, the Union shall direct its members to return to work and the C/S/E shall return all such members back to work.

**4.2** Expiration of Local Agreements: If the Schedule A Agreement, or any local,

regional, and other applicable collective bargaining agreements expire during the term of the Project, the Union(s) agree that there shall be no work disruption of any kind as described in Section 4.1 above as a result of the expiration of any such agreement(s) having application on this Project and/or failure of the involved Parties to that agreement to reach a new contract. Terms and conditions of employment established and set for purposes of prevailing wage requirements under this Agreement at the time of bid shall remain established and set. Otherwise to the extent that such agreement does expire and the Parties to that agreement have failed to reach concurrence on a new contract, work will continue on the Project on one of the following two (2) options, both of which will be offered by the Unions involved to the Contractors affected:

(1) Each of the Unions with a contract expiring must offer to continue working on the Project under interim agreements that retain all the terms of the expiring contract, except that the Unions involved in such expiring contract may each propose wage rates and employer contribution rates to employee benefit funds under the prior contract different from what those wage rates and employer contributions rates were under the expiring contracts. The terms of the Union's interim agreement offered to Contractors will be no less favorable than the terms offered by the Union to any other employer or group of employers covering the same type of construction work in Los Angeles County.

(2) Each of the Unions with a contract expiring must offer to continue working on the Project under all the terms of the expiring contract, including the wage rates and employer contribution rates to the employee benefit funds, if the C/S/E affected by that expiring contract agrees to the following retroactive provisions: if a new Schedule A Agreement, local, regional or other applicable labor agreement for the industry having

application at the Project is ratified and signed during the term of this Agreement and if such new labor agreement provides for retroactive wage increases, then each affected C/S/E shall pay to its employees who performed work covered by this Agreement at the Project during the hiatus between the effective dates of such expired and new labor agreements, an amount equal to any such retroactive wage increase established by such new labor agreement, retroactive to whatever date is provided by the new labor agreement for such increase to go into effect, for each employee's hours worked on the Project during the retroactive period. All Parties agree that such affected C/S/Es shall be solely responsible for any retroactive payment to its employees and that neither the Project, nor the Board, nor the Board's designee, nor any other C/S/E has any obligation, responsibility or liability whatsoever for any such retroactive payments or collection of any such retroactive payments, from any such C/S/E.

(3) Some C/S/Es may elect to continue to work on the Project under the terms of the interim agreement option offered under paragraph (1) above and other C/S/Es may elect to continue to work on the Project under the retroactivity option offered under paragraph (2) above. To decide between the two options, C/S/Es will be given one week after the particular labor agreement has expired or one week after the Union has personally delivered to the Contractors in writing its specific offer of terms of the interim agreement pursuant to paragraph (1) above, whichever is the later date. If the C/S/E fails to timely select one of the above options, the C/S/E will be deemed to have selected paragraphs 4.2(2), above.

**4.3** Expedited Arbitration will be utilized for all work stoppages and lockouts. In lieu of

or in addition to any other action at law or equity, any party may institute the following procedure when a breach or violation of this Article IV is alleged to have occurred:

(1) The party invoking this procedure shall notify the permanent arbitrator next in sequence from the following list:

1. Joseph Gentile
2. Michael Rappaport
3. Walter Daugherty
4. Paul Greenberg
5. Lou Zigman

The Parties agree these shall be the five permanent Arbitrators under this procedure. In the event that none of the five permanent Arbitrators are available for a hearing within 24 hours, the party invoking the procedure shall have the option of delaying until one of the five permanent Arbitrators is available or of asking the permanent Arbitrator that would normally hear the matter to designate an arbitrator to sit as a substitute Arbitrator for this dispute. If any of the permanent Arbitrators ask to be relieved from their status as a permanent Arbitrator, the Parties shall mutually select a new permanent Arbitrator from the following list of arbitrators:

1. John Kagel
2. Fred Horowitz
3. Wayne Estes

Selection shall be made by each party alternately striking from the foregoing list until one name remains who shall be the replacement permanent Arbitrator. Expenses incurred in arbitration shall be borne equally by the Union and the Contractor involved

and the decision of the Arbitrator shall be final and binding on both Parties, provided, however, that the Arbitrator shall not have the authority to alter or amend or add to or delete from the provisions of this Agreement in any way. Notice to the Arbitrator shall be by the most expeditious means available, including by telephone and by facsimile or e-mail to the party alleged to be in violation and to the Trades Council and involved local Union if a Union is alleged to be in violation.

(2) Upon receipt of said notice, the Arbitrator shall convene a hearing within twenty-four (24) hours if it is contended that the violation still exists.

(3) The Arbitrator shall notify the Parties by telephone and by facsimile or telegram of the place and time for the hearing. Notice shall be given to the individual Unions alleged to be involved; however, notice to the Trades Council shall be sufficient to constitute notice to the Unions for purposes of the arbitration being heard by the Arbitrator. Said hearing shall be completed in one session, which, with appropriate recesses at the Arbitrator's discretion, shall not exceed twenty-four (24) hours unless otherwise agreed upon by all Parties. A failure of any party to attend said hearings shall not delay the hearing of evidence or the issuance of any decision by the Arbitrator.

(4) The sole issue at the hearing shall be whether or not a violation of Section 4.1 or 4.2 of this Article IV has in fact occurred. The Arbitrator shall have no authority to consider any matter of justification, explanation or mitigation of such violation or to award damages, which issue is reserved for court proceedings, if any. The decision shall be issued in writing within three (3) hours after the close of the hearing, and may be issued without a written opinion. If any party desires a written opinion, one shall be issued within fifteen (15) days, but its issuance shall not delay compliance with or

enforcement of the decision. The Arbitrator may order cessation of the violation of this Article and other appropriate relief and such decision shall be served on all Parties by hand or registered mail upon issuance.

(5) Such decision may be enforced by any Court of competent jurisdiction upon the filing of this Agreement and all other relevant documents referred to above in the following manner. Written notice of the filing of such enforcement proceedings shall be given to the other party. In the proceeding to obtain a temporary order enforcing the Arbitrator's decision as issued under Section 4.3 (4) of this Article, all Parties waive the right to a hearing and agree that such proceedings may be ex parte. Such agreement does not waive any party's right to participate in a hearing for a final order of enforcement. The Court's order or orders enforcing the Arbitrator's decision shall be served on all Parties by hand or delivered by registered mail.

(6) Any rights created by statute or law governing arbitration proceedings inconsistent with the above procedure or which interfere with compliance therewith are hereby waived by the Parties to whom they accrue.

(7) The fees and expenses incurred in arbitration shall be divided equally by the Parties to the arbitration, including Union(s) and the C/S/E(s) involved.

**4.4** The procedures contained in Section 4.3 shall be applicable to alleged violations of Article IV to the extent any conduct described in Section 4.1 or 4.2 occurs on the Project. Disputes alleging violation of any other provision of this Agreement, including any underlying disputes alleged to be in justification, explanation, or mitigation of any violation of Section 4.1 or Article IV shall be resolved under the applicable grievance adjudication procedures for these other Articles.

## ARTICLE V

NO DISCRIMINATION

**5.1** The C/S/Es and Unions agree not to engage in any form of discrimination, including in the hiring and dispatching of workers, on the grounds of, or because of, race, religion, national origin, ancestry, sex, sexual orientation, age, physical handicap, domestic partner status, medical condition, political affiliation, membership in a labor organization, being a party to a collective bargaining agreement, color, or disability.

## ARTICLE VI

UNION SECURITY

**6.1** The C/S/Es recognize the Unions as comprising the respective sole bargaining representatives for all craft employees working within the scope of this Agreement.

**6.2** No employee covered by this Agreement shall be required to join any Union as a condition of being employed, or remaining employed, for the completion of Project work; provided, however, that any employee who is a member of the referring Union at the time of referral shall maintain that membership in good standing while employed under this Agreement. All employees shall, however, be required to comply with the Union security provisions for the period during which they are performing on-site Project work to the extent, as permitted by law, of rendering payment of the applicable monthly and working dues.

///

///

## ARTICLE VII

REFERRAL

**7.1** The Union(s) shall be the primary source of all craft labor employed on the Project(s) and will exert their best efforts to recruit and identify individuals, particularly residents residing in the Tier 1 or 2 zip code areas, as well as those referred by the Jobs Coordinator, for entrance into joining labor/management apprenticeship programs, and to assist individuals in qualifying and becoming eligible for such programs.

In the event that the C/S/E has his or her own Core Worker(s), and wishes to employ such workers to perform covered work, the C/S/E shall employ such workers in accord with the provisions of this Article VII. The following process shall govern the employment of workers at the Project:

(1) A worker shall be considered a member of a C/S/E's core workforce for the purposes of this Article if the worker meets the required definition of 1.11 above. The C/S/E shall identify Core Workers in their Employment Hiring Plan and shall provide payroll records evidencing the worker's qualification as a Core Worker upon request by the City. Prior to each C/S/E, which utilizes any core employees, performing any work on the Project, each such C/S/E shall provide a list of its core employees to the Department and the Trades Council. Failure to do so will prohibit the C/S/E from using any core employees. The number of Core Workers on this Project shall be governed by the following procedure: one Core Worker shall be selected and one worker from the hiring hall of the affected trade or craft and this process shall repeat until such C/S/E's requirements are met or until such C/S/E has hired five (5) such Core Workers for that craft, whichever occurs first. Thereafter, all additional employees in the affected trade

or craft shall first be requisitioned from the hiring hall in accordance with other provisions in Article VII.

(2) In the event of a reduction-in-force or layoff, such will take place in a manner to assure that the number of Core Workers in the affected craft does not exceed, at any time, the number of others working in that craft who were employed pursuant to other procedures available to the C/S/E under this Agreement. This provision applies only to employees who were not working under the terms of a Schedule A Agreement at the time of their transfer to the work covered under this Agreement and is not intended to limit transfer provisions of the Schedule A Agreements of any Union.

**7.2** C/S/Es shall be bound by and utilize the registration facilities and referral systems established or authorized by the signatory Unions for all job site craft employee(s) before such employee(s) begin work, when such procedures are not in violation of Federal or State law or in conflict with provisions set forth in this Agreement.

**7.3** In the event that referral facilities maintained by the Unions are unable to fill the requisition of a C/S/E for Local Residents and/or Transitional Workers within a forty-eight (48) hour period after such requisition is made by the C/S/E (Saturdays, Sundays, and holidays excepted), the C/S/E shall be free to obtain Local Residents and/or Transitional Workers from any source. However, for all other requisitions by a C/S/E for non-Local Residents or non-Transitional Workers, only after a forty-eight (48) hour period (Saturdays, Sundays and holidays excepted) after such requisition is made by the C/S/E shall the C/S/E be free to obtain work persons from any source if the Unions are unable to fill the requisition. However, the C/S/E is still responsible for complying

with conditions and requirements of the Targeted Hiring Guidelines for Contractors and the Policy.

(1) The C/S/E's must document, from the applicable Tiers, all efforts made to comply with the targeted hiring process to locate and hire Local Residents and/or Transitional Workers. The C/S/E may employ Local Residents and/or Transitional Workers referred by the Jobs Coordinator. However, in the event the Jobs Coordinator is unable to fill the requisition of a C/S/E for Local Residents and/or Transitional Workers, the C/S/E may utilize any organization, such as those listed in the Targeted Hiring Guidelines for Contractors, to assist them in satisfying the requirements of the Targeted Hiring Guidelines for Contractors and the Policy.

(2) The C/S/E shall inform the Unions, Job Coordinator and the BCA of the name, address, worker craft classification and social security number of any worker hired from other sources upon their employment on the Project(s).

(3) No Local Resident and/or Transitional Worker, having been pre-screened and/or pre-qualified by the Jobs Coordinator, and employed by the C/S/E to work on the Project, shall be required to participate in any Joint Labor/Management "boot camp" or pre-apprentice program that will unnecessarily delay the Local Resident and/or Transitional Worker's start of work or cause said worker's termination due to having to participate in such "boot camps" or pre-apprentice programs.

(4) Any work person hired under this Section 7.3, as well as all other workers hired under this Article VII, shall be obligated to register with the appropriate Union hiring hall within five (5) working days prior to their first day of employment on the project and comply with the Union Security provisions of this Agreement.

**7.4** The Unions will exert their best efforts to refer/recruit sufficient numbers of skilled craft Local Residents and Transitional Workers to fulfill the requirements of the C/S/E(s). In recognition of the fact that the communities within the boundaries of the City and the Port's impact zone will be impacted by the construction of the Project, the Parties agree to support the development and graduation of transitional construction apprentices and workers from residents within Tiers 1 or 2 zip code areas. Towards that end, the Unions agree to encourage and provide referrals and utilization of qualified workers residing preferably within the Tier 1 zip code areas identified in the following:

Tier 1 Zip Codes

| | | | | |
|---|---|---|---|---|
| 90001 | 90222 | 90501 | 90732 | 90804 |
| 90002 | 90242 | 90502 | 90744 | 90805 |
| 90003 | 90247 | 90503 | 90745 | 90806 |
| 90044 | 90249 | 90505 | 90746 | 90807 |
| 90059 | 90255 | 90710 | 90748 | 90808 |
| 90061 | 90262 | 90717 | 90755 | 90810 |
| 90220 | 90280 | 90723 | 90802 | 90813 |
| 90221 | 90303 | 90731 | 90803 | 90815 |

**7.5** When the Unions cannot provide the C/S/Es, having documented their efforts in the attainment of Local Residents and/or Transitional Workers within the Tier 1 zip code areas as listed in Article 7.4 above, the Unions will exert their best efforts to recruit and identify Local Residents and/or Transitional Workers within Tier 2 zip code areas identified in the following and Transitional Workers in the remaining zip code areas of the City:

Tier 2 Zip Codes

| | | | | |
|---|---|---|---|---|
| 90004 | 90023 | 90045 | 91042 | 91364 |
| 90005 | 90024 | 90046 | 91302 | 91367 |
| 90006 | 90026 | 90007 | 91303 | 91401 |
| 90007 | 90027 | 90048 | 91304 | 91402 |

| | | | | |
|---|---|---|---|---|
| 90008 | 90028 | 90049 | 91306 | 91403 |
| 90010 | 90029 | 90057 | 91324 | 91405 |
| | 90031 | 90058 | 91325 | 91406 |
| 90012 | 90033 | 90062 | | 91411 |
| 90013 | 90034 | 90063 | 91331 | 91423 |
| 90014 | 90035 | 90065 | 91335 | 91505 |
| 90015 | 90036 | 90066 | 91340 | 91601 |
| 90016 | 90037 | 90068 | 91342 | 91602 |
| 90017 | 90038 | 90071 | 91343 | 91604 |
| | | 90073 | 91344 | 91605 |
| 90019 | | 90089 | 91345 | 91606 |
| 90020 | 90042 | | 91352 | 91607 |
| 90021 | 90043 | 91040 | 91356 | |

The Unions will exert their best efforts to recruit and identify Local Residents and/or Transitional Workers of the City and assist individuals in qualifying and becoming eligible for such apprenticeship programs.

**7.6** The Prime Contractor is responsible for ensuring compliance with the targeted hiring process for the Project(s) to achieve the following anticipated levels of participation:

(1) The following percentages shall be the targeted hiring for the Project:

(a) At least 30% of total work hours shall be performed by Local Residents residing within Tier 1 described in Article 7.4. If the 30% local hire is not attained utilizing the Tier 1, the outreach shall expand to the Tier 2 as described in Article 7.5 of this Agreement.

(b) At least 10% of total work hours shall be performed by Transitional Workers residing within Tier 1 or Tier 2 zip code areas described in Articles 7.4 and 7.5 respectively and the remaining zip code areas within the City of Los Angeles. These hours shall be applied towards the 30% Local Resident targeted hiring.

(c) At least 20% of total work hours on each project will be performed by apprentices, but the hours performed by apprentices in each individual craft shall not exceed the ratio to journeymen established by the applicable craft union's DAS approved apprenticeship standards. The Parties agree that residents in the Tier 1 or 2 zip code areas will perform 50% of all apprenticeship hours worked on the Project.

An apprentice who begins his/her period of apprenticeship as a resident in the Tier 1 or 2 zip code areas will retain that status for the entire apprenticeship, regardless of any changes in the apprentice's residence provided the Unions submit to BCA the necessary identifying information to enable the tracking of such apprentices, if requested by BCA.

(d) The C/S/Es shall document their compliance efforts through the utilization of the Craft Request Form, hiring hall procedures, the resources of organizations listed in BCA's Targeted Hiring Guidelines for Contractors, Jobs Coordinator or any other organization/agency that can assist the C/S/E in meeting this requirement. The provisions to address the non-attainment of the targeted hiring participation and/or apprenticeship hiring participation levels on a Project are addressed in the Policy.

(2) The employer retains authority in making individual hiring decisions.

(3) Hours worked by residents of states other than California shall not be included in calculation of total hours of Project work for purposes of the percentage requirements set forth above.

(4) The above referenced targeted hiring shall apply to FHWA projects in accord with the policies and conditions under which the FHWA funds are received from the U.S. Department of Transportation.

**7.7** The Transitional Workers, as also defined also in Section 1.29, above, may be referred to the Unions from the Jobs Coordinator qualified to perform construction jobs coordination and related services. The Jobs Coordinator shall pre-screen and/or pre-qualify any applicant prior to referral to the Unions. Drug screening will be a prerequisite to employment. The following criteria will be used to identify the Transitional Worker:

a. Being a Veteran;

b. Having a documented history of involvement with the justice system;

c. Being homeless; or

(2) Faces at least two of the following barriers to employment:

a. Having household income below 50% of the Los Angeles County's median annual household income;

b. Emancipated from the foster care system ;

Receiving public assistance;

Lacking a GED or high school diploma;

Being an apprentice with less than 15% of the apprenticeship hours

c required to graduate to journey level in a program described in Section 1.3;

d. Being a custodial single parent

e. Suffering from long-term unemployment

To qualify under this section, the Jobs Coordinator shall verify and certify that the

individual's primary place of residence is within the City and that such individual satisfies the criteria set forth above.

**7.8** The C/S/Es and the Unions recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The C/S/Es and Unions agree to utilize the services of the Center for Military Recruitment, Assessment and Veterans Employment (hereinafter "Center") and the Center's "Helmets to Hardhats" program to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the Parties.

**7.9** The Unions and C/S/Es agree to coordinate with the Center to create and maintain an integrated database of veterans interested in working on a Project and of apprenticeship and employment opportunities for a Project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

**7.10** C/S/Es agree to only use the Craft Request Form (See Attachment C) and the procedures written therein to request any and all workers from Unions with a concurrent transmittal of such request to the Jobs Coordinator, including workers qualified as Local Residents, Transitional Workers, and/or general dispatch.

(1) When Local Residents and/or Transitional Workers are requested by the C/S/Es, the Unions will refer such workers regardless of their place in the Unions' hiring halls' list and normal referral procedures.

(2) In the event that a C/S/E, having not achieved its targeted hiring participation levels, requests a Local Resident and/or Transitional Worker from the

Union hiring facility, and is referred a worker who is not a Local Resident and/or Transitional Worker, the C/S/E is under no obligation to hire the referred worker for the Project work and shall notify the Union hiring facility and the Jobs Coordinator.

(3) The C/S/Es, Unions and Jobs Coordinator agree to maintain copies of all Craft Request Forms used on the Project submitted or received including transmission verification reports that are date/time imprinted. All Craft Request Forms and transmission verification reports shall be available for inspection and copies provided, upon request by the Harbor Department representative as described in Article XI of this Agreement.

**7.11** Apprentices

(a) The Parties recognize the need to maintain continuing support of the programs designed to develop adequate numbers of competent workers in the construction industry, the obligation to capitalize on the availability of the Harbor Department's and the City's local work force, and the opportunities to provide continuing work for Projects covered by this Agreement. To these ends, the Parties shall facilitate, encourage, and assist Local Residents and/or Transitional Workers within Tier 1 or 2 zip code areas to commence and progress in Labor/Management apprenticeship and/or training programs in the construction industry leading to participation in such apprenticeship programs. The Harbor Department, Jobs Coordinator, Work Source Centers, other non-profit entities, organizations and the Unions, will work cooperatively to identify, or establish and maintain effective programs and procedures for persons interested in entering the construction industry and which will help prepare them for the

formal joint Labor/Management apprenticeship programs maintained by the signatory unions.

(b) Unions shall track retention of Apprentices hired through this program for so long as those Apprentices participate in a joint labor/management apprenticeship program. The signatory unions shall collect and compile information on the retention of these Apprentices and submit this information to the Department and the BCA on a quarterly basis. The City will use the information provided to generate a quarterly report on the retention of Apprentices on the Department's PLA projects.

(c) All apprentices shall work under the direct supervision of a journeyman from the trade in which the apprentice is indentured. A journeyman shall be defined as set forth in the California Code of Regulations, Title 8 [apprenticeship] section 205, which defines a journeyman as a person who has either completed an accredited apprenticeship in his or her craft, or has completed the equivalent of an apprenticeship in length and content of work experience and all other requirements in the craft which has workers classified as journeyman in the apprenticeable occupation. Should a question arise as to a journeyman's qualification under this subsection, the C/S/E shall provide adequate proof evidencing the worker's qualification as a journeyman.

## ARTICLE VIII

## WAGES AND BENEFITS

**8.1** Wages. All employees covered by this Agreement shall be classified in accordance with work performed and paid the hourly wage rates for those classifications in compliance with the applicable prevailing wage rate determination established pursuant to the California Labor Code by the Department of Industrial

Relations or as established by the US DOL if applicable. If a prevailing rate increases during the term of this Agreement under State law or Federal law, the Contractor shall pay the rate as of its effective date under the applicable law. C/S/Es directly signatory to one or more of the Schedule A Agreements are required to pay all wages set forth in those Schedule A Agreements without reference to the foregoing. If the prevailing wage laws are repealed during the term of this Agreement, the contractor shall pay the wage rates established under the Schedule A Agreements, except as otherwise provided in this Agreement.

**8.2** Benefits.

(a) C/S/Es not signatory to the established Labor/Management Trust Fund agreements, as specified in the Schedule A Agreements for the craft workers in their employ, shall sign a "Subscription Agreement" with the appropriate Labor/Management Trust Fund covering the work performed under this agreement.

(b) C/S/Es shall pay contributions to the established employee benefit funds on behalf of all employees performing Project work under this Agreement in the amounts designated in the appropriate Schedule A Agreement and make all employee-authorized deductions in the amounts designated in the appropriate Schedule A Agreement; provided, however, that such contributions shall not exceed the contribution amounts set forth in the applicable prevailing wage determination. C/S/Es directly Signatory to one or more of the Schedule A Agreements are required to make all contributions set forth in those Schedule A Agreements without reference to the forgoing. Bona fide jointly-trusteed benefit plans or authorized employee deductions programs established or negotiated under the applicable Schedule A Agreement or by

the Parties to this Agreement during the life of this Agreement may be added, provided that the contributions do not exceed the amounts set forth in the applicable prevailing wage determination.

(c) The C/S/E adopts and agrees to be bound by the written terms of the applicable, legally established, trust agreement(s) specifying the detailed basis on which payments are to be made into, and benefits paid out of, such trust funds for its employees. The C/S/E authorizes the Parties to such trust funds to appoint trustees and successors' trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the C/S/E.

## ARTICLE IX

EMPLOYEE GRIEVANCE PROCEDURE

**9.1** Should a grievance arise regarding the imposition of discipline of an employee, or the dismissal of an employee, working on Project work, all such grievance(s) shall be processed, exclusively, under the grievance procedure contained in the applicable Schedule A Agreement for the craft Union representing such employee(s) and not under the provisions of the Grievance Arbitration provisions of Article XIII. C/S/Es shall not discipline or dismiss its employees except for good cause.

## ARTICLE X

DEPARTMENT POLICIES AND PROCEDURES

**10.1** All construction contracts identified by the Harbor Department as part of the Project shall include the following provisions. Such provisions include, but are not limited to:

(1) All persons who perform labor in the execution of a construction contract shall be paid the prevailing rate of wages applicable to the classification as provided in Article III, Section 377 of the Los Angeles City Charter.

(2) All C/S/Es shall provide information concerning their experience, financial qualifications, including proof of a current State Contractor's License, Business Tax Registration Certificate, and ability to perform said contract or subcontract.

**10.2** In addition to the above requirements, the C/S/Es and Unions understand and agree that all construction contracts shall be awarded in accordance with other applicable provisions of the Los Angeles City Charter ("Charter") (effective July 1, 2000), and the Los Angeles Administrative Code ("Administrative Code") (and any future amendments applicable thereto), including but not limited to:

(1) Los Angeles City Charter Article III, Section 371 (award of construction contracts to the lowest responsible bidder);

(2) Harbor Department policies providing Small Business Enterprises ("SBE"), Very Small Businesses ("VSBE"), and Minority-Owned, Women-Owned and all Other Business Enterprises ("MBE"/"WBE"/"OBE") an equal opportunity to participate in the performance of all City contracts in all areas where such contracts afford such participation opportunities.

## ARTICLE XI

## COMPLIANCE

**11.1** It shall be the responsibility of the C/S/Es and Unions to investigate and monitor compliance with the provisions of the Agreement contained in Article VIII (Wages and Benefits). The Board shall appoint the BCA or its designee to investigate and monitor

compliance with Article VIII, the applicable provisions of the Charter and the Administrative Code, including, but not limited to, the prevailing wage requirements of the Charter, Local Residents, and Disadvantaged Worker hiring compliance and the Policy, and the affirmative action provisions of the Administrative Code, and to recommend to the Board or designee enforcement measures to ensure the C/S/E's compliance with the general conditions of a construction contract and the Policy. At the conclusion of any six-month period, the Parties to the Agreement shall report to the Board with a status update on the Agreement with regard to that Project, including a description of any obstacles or barriers faced. The provisions of this Article shall not substitute for or preclude any employee or Union from filing a grievance for any violation of Article VIII under the provisions of the Grievance Arbitration Procedure provisions of Article XIII.

**11.2** Each C/S/E shall cooperate fully and promptly with any inquiry or investigation the City or its designated representatives deems necessary in order to monitor compliance with the provisions in this Agreement and the Policy.

## ARTICLE XII

### JOINT ADMINISTRATIVE COMMITTEE

**12.1** The Parties to this Agreement may establish an eight (8) person Joint Administrative Committee (JAC). This JAC shall be comprised of three (3) representatives selected by the Department and one (1) representative of the prime contractor, and four (4) representatives of the signatory Unions to be appointed by the Trades Council to be chaired jointly by a representative of the Department and the Council.

Each representative shall designate an alternate who shall serve in his or her absence.

**12.2** The JAC shall meet at the call of either of the joint chairs to discuss the implementation and administration of this Agreement, the progress of the Project, general labor management problems that may arise, and any other matters consistent with this Agreement. A unanimous decision of the JAC shall be final and binding upon all Parties. However, the JAC shall have no authority to make determinations upon or to decide grievances arising under this Agreement.

**12.3** A quorum will consist of at least two (2) City and two (2) signatory union representatives. For voting purposes, only an equal number of City and signatory union representatives present may constitute a voting quorum.

## ARTICLE XIII

## GRIEVANCE ARBITRATION PROCEDURE

**13.1** The Parties hereby agree that all grievances and disputes that may arise concerning the meaning, application or the interpretation of the terms of this Agreement, other than disputes arising from conduct described in Article IV (Work Stoppages, Strikes, Sympathy Strikes and Lockouts), Article IX (Employee Grievance Procedure) and Article XIV (Jurisdictional Disputes), shall be settled in accordance with the following procedures set out herein. Grieving parties are encouraged to meet as soon as possible and try to resolve the dispute. However, if a resolution cannot be reached, the following procedure shall be used.

**13.2** Grievances and disputes shall be settled according to the following procedures:

Step 1: The business representative of the local Union involved shall first attempt to settle the matter by oral discussion with the particular C/S/E's representative no later than five (5) working days after the Union submitting the grievance first became aware of, or by the use of reasonable diligence should have been aware of, the occurrence first giving rise to the dispute or grievance. If the matter is not resolved with the C/S/E's representative within five (5) working days after the oral discussion with said C/S/E's representative, the dispute or grievance shall be reduced to writing by the grieving Union.

Step 2: In the event that the representatives (C/S/E and Union) are unable to resolve the grievance after its referral to Step 1, either involved party may submit the grievance, within five (5) business days of the Step 1 meeting of the parties to the grievance, to the Joint Administrative Committee (JAC), which shall meet within five (5) business days after such referral (or such longer time as is mutually agreed upon by all representatives of the JAC), to confer in an attempt to resolve the grievance. If the grievance is not resolved by the parties to the grievance within five (5) business days after its referral (or such longer time as is mutually agreed on by all representatives of the JAC) to the JAC, it may be referred within five (5) business days by either party to Step 3 by written notice of the submittal of the grievance to arbitration in accordance with the provisions set forth below.

Step 3: After notice by any party of intent to submit a grievance to arbitration, the Parties shall have five (5) working days to attempt, by mutual agreement, to

select as the Arbitrator to hear the dispute, one of the Arbitrators listed under the Expedited Arbitration provisions of Article 4.3 of this Agreement. If the Parties are unable to reach such agreement, the first arbitrator from the list, on a rotational basis, shall be the arbitrator to hear the dispute. The decision of the Arbitrator shall not have the authority to alter, amend, add to or delete from the provisions of this Agreement in any way. A failure of any party to attend said hearing shall not delay the hearing of evidence or the issuance of any decision by the Arbitrator. Should any party seek confirmation of the award made by the Arbitrator, the prevailing party shall be entitled to receive its reasonable attorney fees and costs.

**13.3** The time limits specified in any step of the Grievance Arbitration Procedure set forth in Section 13.2 may be extended by mutual agreement of the Parties. However, failure to process a grievance, or failure to respond in writing within the time limits provided above, without a request for an extension of time, shall be deemed a waiver of such grievance without prejudice, or without precedent to the processing and/or resolution of like or similar grievances.

**13.4** Grievances which are settled directly by the Parties to such grievance shall not be precedent setting.

**13.5** The Harbor Department or its designated representative shall be given advance notification of all proceedings of all actions at Steps 2 and 3 and may observe such proceedings upon request.

///

///

## ARTICLE XIV

JURISDICTIONAL DISPUTES

**14.1** The assignment of work will be solely the responsibility of the C/S/E performing the work involved; and such work assignments will be in accordance with the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry (the "Plan") or any successor plan.

**14.2** All jurisdictional disputes on this Project, between or among Building and Construction Trades Unions and employers shall be settled and adjusted according to the present Plan established by the Building and Construction Trades Department or any other plan or method of procedure that may be adopted in the future by the Building and Construction Trades Department. Decisions rendered shall be final, binding and conclusive on the C/S/Es and Unions. A decision shall not award back pay or any other damages for a misassignment of work, nor may any party bring an independent action for back pay or any other damages based upon a decision.

(1) If a dispute arising under this Article involves the Southwest Regional Council of Carpenters or any of its subordinate bodies, an Arbitrator shall be chosen by the procedures specified in Article V, Section 5 of the Plan from a list composed of John Kagel, Thomas Angelo, Robert Hirsch and Thomas Pagan. The Arbitrator's hearing on the dispute shall be held at the offices of the Council within fourteen (14) days of the selection of the Arbitrator. All other procedures shall be as specified in the Plan.

**14.3** No Work Disruption Over Jurisdiction. All jurisdictional disputes shall be resolved without the occurrence of any strike, work stoppage, disruption, or slow down of any nature and the C/S/E's assignments shall be adhered to until the dispute is resolved.

Individuals violating this section shall be subject to immediate discharge.

**14.4** Pre-Job Conference. A pre-job conference shall be held with all parties prior to the start of work by the prime contractor for the Project covered by this Agreement. The purpose of the conference will be to, among other things, determine craft manpower needs, schedule of work for the contract and Project work rules/owner rules. The subcontractors/owner operators of any tier will be advised in advance of all such conferences and shall participate. The Trades Council and the BCA's Office of Contract Compliance shall be advised in advance of all such conferences and may participate if they wish. All work assignments shall be disclosed by the C/S/E at a pre-job conference. Any formal jurisdictional dispute raised under Article XIV must be raised at the pre-job conference upon disclosure of the work assignments. If the C/S/E intends to change the work assignment after the pre-job conference or to make an assignment of work not previously known, the C/S/E must notify the appropriate affected craft union(s) prior to the commencement of work. The C/S/E performing all project work that was not previously assigned at the pre-job conference will conduct a separate pre-job conference for such newly assigned work prior to commencing such work.

## ARTICLE XV

## MANAGEMENT RIGHTS

**15.1** The C/S/Es shall retain full and exclusive authority for the management of their operations including, but is not limited to, the right to direct their working force and to establish coordinated working hours and starting times, which shall not be in conflict with the Schedule A Agreements of the Unions.

**15.2** There shall be no limit on production by workers or restrictions on the full use of tools or equipment. Craftsmen using tools shall perform any of the work of the trades and shall work under the direction of the craft foremen. There shall be no restrictions on efficient use of manpower other than as may be required by safety regulations. The C/S/Es may utilize the most efficient methods or techniques of construction, tools or other labor-saving devices to accomplish the work. Restrictive practices not a part of the terms and conditions of this Agreement will not be recognized.

**15.3** The C/S/Es shall be the sole judge of the number and classifications of employees required to perform work subject to this Agreement and shall have the absolute right to hire, promote, suspend, discharge or lay off employees at their discretion and to reject any applicant for employment, subject to the provisions of the respective craft collective bargaining agreement between the particular C/S/E and Union and pursuant to this Agreement.

**15.4** Nothing in this Agreement shall be construed to limit the right of any of the C/S/Es' to select the lowest bidder they deem qualified for the award of contracts or subcontracts or material, supplies, or equipment purchase orders on the Project. The right of ultimate selection remains solely with the C/S/E in accordance with the construction contract.

**15.5** It is recognized that certain materials, equipment and systems of a highly technical and specialized nature will have to be installed at the Project. The nature of the materials or the nature of the equipment and systems, together with requirements of manufacturer's warranty, dictate that it will be pre-fabricated, pre-piped, pre-wired and/or installed under the supervision and direction of the Harbor Department, City

and/or manufacturer's personnel. The Unions agree that such materials, equipment and systems shall be installed without the occurrence of any conduct described in Section 4.1 or 4.2.

## ARTICLE XVI

### SAFETY, PROTECTION OF PERSON AND PROPERTY

**16.1** It shall be the responsibility of each C/S/E to ensure safe working conditions and employee compliance with any safety rules contained herein or established by the Harbor Department, City, the state and the C/S/E. It is understood that the employees have an individual obligation to use diligent care to perform their work in safe manner and to protect themselves and the property of the C/S/E and the Harbor Department.

**16.2** Employees shall be bound by the safety, security and visitor rules established by the C/S/E and the Harbor Department. These rules will be published and posted in conspicuous places throughout the work site. An employee's failure to satisfy his/her obligations under this Section will subject him/her to discipline, including discharge.

**16.3** The Parties acknowledge that the Harbor Department and the C/S/E have a policy, which prohibits the use, sale, transfer, purchase and/or possession of a controlled substance, alcohol and/or firearms while on the Harbor Department's premises. Additionally, the C/S/E has a "drug free" work place policy, which prohibits those working on the Harbor Department's premises from having a level of alcohol in their system, which could indicate impairment, and/or any level of controlled substances (i.e., illegal drugs) in their system.

**16.4** To that end, the Parties agree to adopt the Los Angeles/Orange Counties Building and Construction Trades Council Approved Drug and Alcohol Testing Policy, a

copy of which is attached hereto as Attachment "B" which shall be the policy and procedure utilized under this Agreement.

## ARTICLE XVII

SAVINGS CLAUSE

**17.1** The Parties agree that in the event any article, provision, clause, sentence or work of the Agreement is determined to be illegal or void as being in contravention of any applicable law, by a court of competent jurisdiction, the remainder of the Agreement shall remain in full force and effect. The Parties further agree that if any article, provision, clause, sentence or word of the Agreement is determined to be illegal or void, by a court of competent jurisdiction, the Parties shall substitute, by mutual agreement, in its place and stead, an article, provision, sentence or word which will meet the objections to its validity and which will be in accordance with the intent and purpose of the article, provision, clause, sentence or word in question.

**17.2** The Parties also agree that in the event that a decision of a court of competent jurisdiction materially alters the terms of the Agreement such that the intent of the Parties is defeated, then the entire Agreement shall be null and void.

**17.3** If a court of competent jurisdiction determines that all or part of the Agreement is invalid and/or enjoins the City or the Harbor Department from complying with all or part of its provisions and the Board accordingly determines that the Agreement will not be required as part of an award to a C/S/E, the Unions will no longer be bound by the provisions of Article IV to the extent that such C/S/E is no longer bound. The Unions and their members shall remain bound to Article IV with respect to all other C/S/Es who remain bound to this Agreement, and no action taken by the Unions or their members

shall disrupt the work of such C/S/Es.

**17.4** The provisions of this Agreement shall not be applicable where prohibited by Presidential Executive Order, Federal or State law, or where the application would be inconsistent with terms and conditions of a grant or a contract with the agency of the United States, State of California, or the instruction of an authorized representative of any of these agencies with respect to any grant or contract.

## ARTICLE XVIII

### STEWARD

**18.1** Each Union shall have the right to designate a working craft employee as steward for each C/S/E employing such craft on the Project. Such designated steward shall be a qualified workman assigned to a crew and shall perform the work of the craft. The steward shall not perform supervisory duties. Under no circumstances shall there be nonworking stewards. Stewards shall be permitted a reasonable amount of time during working hours to perform applicable Union duties related to the work being performed by the craft employees of his/her C/S/E and not to the work being performed by other C/S/Es or their employees.

**18.2** Authorized representatives of the Union(s) shall have access to the Covered Project, provided that such representatives fully comply with posted visitor, security, and safety rules and the environmental compliance requirements of the Covered Project, provided that they do not unnecessarily interfere with the employees or cause them to neglect their work. The Contractor recognizes the right of access set forth in this Section and such access will not be unreasonably withheld from an authorized representative of the Union.

## ARTICLE XIX

TERM

**19.1** This Agreement shall commence upon execution by all Parties (the City of Los Angeles Harbor Department and the Los Angeles/Orange Counties Building and Construction Trades Council and the Craft Unions signatory to this Agreement) and shall continue in full force and effect from the date of execution by all Parties for a period of ten (10) years. During the term of this Agreement, upon request by either Party or by mutual consent, the Parties will meet to discuss the application of and their experience with this Agreement. As a result of any such meeting, the Parties may, but shall not be obligated to, mutually agree to amendments or modification of this Agreement.

**19.2** The Agreement shall continue in full force and effect for each covered Project until project acceptance by the Board. Either party desiring to renew, extend or to negotiate changes to this Agreement upon expiration, shall make such intention known to the other party by written notice thereof not less than six (6) months prior to the expiration of this Agreement.

**19.3** Any covered Project awarded during the term of this Agreement shall continue to be covered hereunder, until completion of the Project, notwithstanding the expiration date of this Agreement.

///

///

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement on the day and year written below.

THE UNION OFFICIALS signing this Agreement warrant and represent that they are authorized to collectively bargain on behalf of the organizations whom they represent and the members of such organizations.

**THE CITY OF LOS ANGELES HARBOR DEPARTMENT**

By: _____ Date: 12-11-17
Eugene D. Seroka
Executive Director

By: _____ Date: 12-11-17
Amber Klesges
Commission Secretary

**LOS ANGELES/ORANGE COUNTY BUILDING AND CONSTRUCTION TRADES COUNCIL**

By: _____ Date: 5-17-17
Ron Miller
Executive Secretary
Los Angeles/Orange County Building
And Construction Trades Council

APPROVED AS TO FORM:

Michael N. Feuer, City Attorney

By: _____ Date: 5/17/2017
Hugo S. Rossitter
Deputy City Attorney

**Union Signatory Page**

Asbestos Heat & Frost Insulators (Local 5)

Boilermakers (Local 92)

Bricklayers & Allied Craftworkers (Local 4)

Cement Masons (Local 500)

District Council of Laborers

Electricians (Local 11)

Elevator Constructors (Local 18)

Gunite Workers (Local 345)

Iron Workers (Reinforced – Local 416)

Iron Workers (Structural – Local 433)

Laborers (Local 1309)

Laborers (Local 300) (Remediation)

Operating Engineers (Local 12)

Operating Engineers (Local 12)

Operating Engineers (Local 12)

Painters & Allied Trades DC 36

Pipe Trades (Local 250)

Pipe Trades (Local 345)

Pipe Trades (Plumbers Local 78)

Pipe Trades (Sprinkler Fitters Local 709)

Plasterers (Local 200)

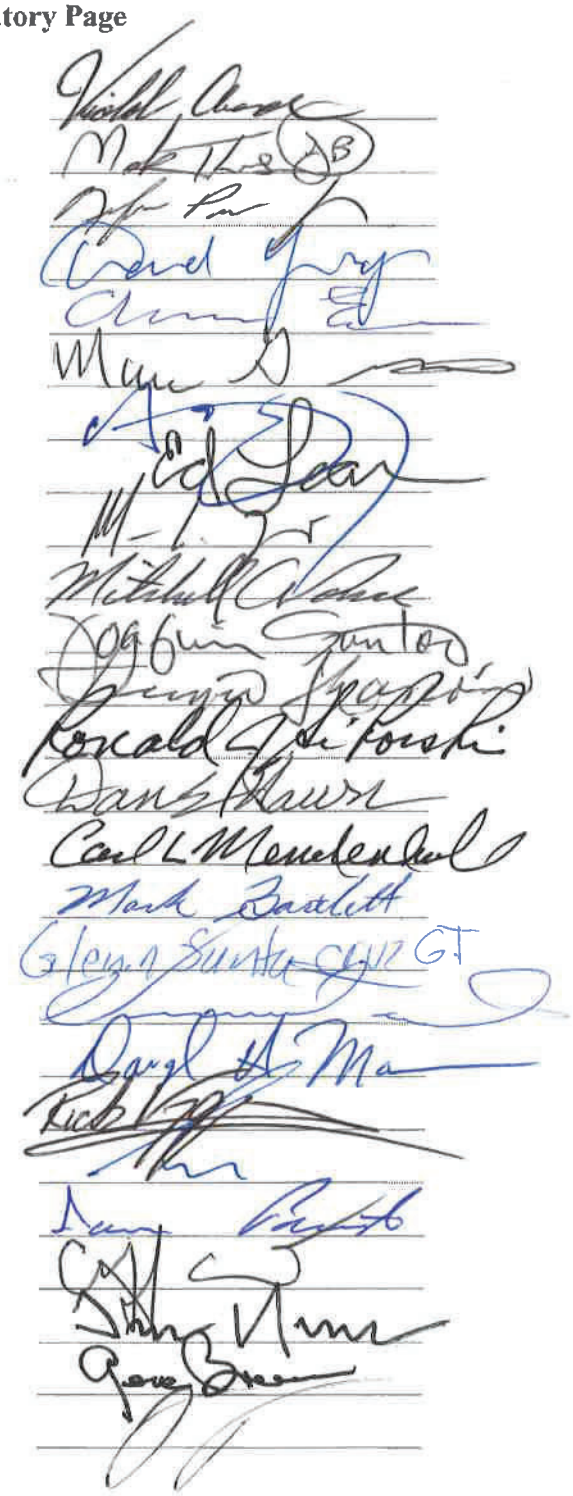
Plaster Tenders (Local 1414)

Roofers & Waterproofers (Local 36)

Sheet Metal Workers (Local 105)

Teamsters (Local 986)

Southwest Regional Council of Carpenters



## *ATTACHMENT "A"*

COMPANY LETTERHEAD

Date: _____

Mr. Shaun Shahrestani
Chief Harbor Engineer
Construction Division
Port of Los Angeles
425 S. Palos Verdes Street
San Pedro, CA. 90731

SUBJECT: LETTER OF ASSENT

Dear Mr. Shahrestani:

This is to certify that the undersigned Contractor/Employer has examined a copy of the subject Project Labor Agreement entered into by and between the City of Los Angeles Harbor Department and Los Angeles/Orange Counties Building and Construction Trades Council and the signatory Unions dated _____. The undersigned Contractor/Employer hereby agrees to comply with all of the terms and conditions of the aforementioned Project Labor Agreement as such labor Agreement may, from time to time, be amended by the parties or interpreted pursuant to its terms.

It is understood that the signing of the letter of Assent shall be as binding on the undersigned Contractor/Employer as though the Contractor/Employer had signed the above referred Agreement and shall require all its subcontractors, of whatever tier, to become similarly bound for all work within the scope of this Agreement.

This Letter of Assent shall become effective and binding upon the undersigned Contractor/Employer the _____ day of _____, _____, and shall remain in full force and effect until the completion of the above stated project.

Sincerely,

(Name of Construction Company)

By:_____
(Name and Title of Authorized Executive)

Contractor's State License No.: _____

cc:

## ATTACHMENT B

LOS ANGELES/ORANGE COUNTIES

BUILDING AND CONSTRUCTION TRADES COUNCIL

APPROVED

DRUG AND ALCOHOL TESTING POLICY

The Parties recognize the problems which drug and alcohol abuse have created in the construction industry and the need to develop drug and alcohol abuse prevention programs. Accordingly, the Parties agree that in order to enhance the safety of the work place and to maintain a drug and alcohol free work environment, individual Employers may require applicants or employees to undergo drug and alcohol testing.

1. It is understood that the use, possession, transfer or sale of illegal drugs, narcotics, or other unlawful substances, as well as being under the influence of alcohol and the possession or consuming alcohol is absolutely prohibited while employees are on the Employer's job premises or while working on any jobsite in connection with work performed under the Project Labor Agreement ("PLA").

2. No Employer may implement a drug testing program which does not conform in all respects to the provisions of this Policy.

3. No Employer may implement drug testing at any jobsite unless written notice is given to the Union setting forth the location of the jobsite, a description of the project under construction, and the name and telephone number of the Project Supervisor. Said notice shall be addressed to the office of each Union signing the PLA. Said notice shall be delivered in person or by registered mail before the implementation of drug testing. Failure to give such notice shall make any drug testing engaged in by

the Employer a violation of the PLA, and the Employer may not implement any form of drug testing at such jobsite for the following six months.

4. An employer who elects to implement drug testing pursuant to this Agreement shall require all employees on the Project to be tested. With respect to individuals who become employed on the Project subsequent to the proper implementation of this drug testing program, such test shall be administered upon the commencement of employment on the project, whether by referral from a Union Dispatch Office, transfer from another project, or another method. Individuals who were employed on the project prior to the proper implementation of this drug testing program may only be subjected to testing for the reasons set forth in Paragraph 5(f) (1) through 5(f) (3) of this Policy. Refusal to undergo such testing shall be considered sufficient grounds to deny employment on the project.

5. The following procedure shall apply to all drug testing:

a. The Employer may request urine samples only. The applicant or employee shall not be observed when the urine specimen is given. An applicant or employee, at his or her sole option, shall, upon request, receive a blood test in lieu of a urine test. No employee of the Employer shall draw blood from a bargaining unit employee, touch or handle urine specimens, or in any way become involved in the chain of custody of urine or blood specimens. A Union Business Representative, subject to the approval of the individual applicant or employee, shall be permitted to accompany the applicant or employee to the collection facility to observe the collection, bottling, and sealing of the specimen.

b. The testing shall be done by a laboratory approved by the Substance Abuse & Mental Health Services Administration (SAMHSA), which is chosen by the Employer and the Union.

c. An initial test shall be performed using the Enzyme Multiplied Immunoassay Technique (EMZT). In the event a question or positive result arises from the initial test, a confirmation test must be utilized before action can be taken against the applicant or employee. The confirmation test will be by Gas Chromatography Mass Spectrometry (GC/MS). Cutoff levels for both the initial test and confirmation test will be those established by the SAMHSA. Should these SAMHSA levels be changed during the course of this agreement or new testing procedures are approved, then these new regulations will be deemed as part of this existing agreement. Confirmed positive samples will be retained by the testing laboratory in secured long-term frozen storage for a minimum of one year. Handling and transportation of each sample must be documented through strict chain of custody procedures.

d. In the event of a confirmed positive test result the applicant or employee may request, within forty-eight (48) hours, a sample of his/her specimen from the testing laboratory for purposes of a second test to be performed at a second laboratory, designated by the Union and approved by SAMHSA. The retest must be performed within ten (10) days of the request. Chain of custody for this sample shall be maintained by the Employer between the original testing laboratory and the Union's designated laboratory. Retesting shall be performed at the applicant's or employee's expense. In the event of conflicting test results the Employer may require a third test.

e. If, as a result of the above testing procedure, it is determined that an applicant or employee has tested positive, this shall be considered sufficient grounds to deny the applicant or employee his/her employment on the Project.

f. No individual who tests negative for drugs or alcohol pursuant to the above procedure and becomes employed on the Project shall again be subjected to drug testing with the following exceptions:

1. Employees who are involved in industrial accidents resulting in damage to plant, property or equipment or injury to him/herself or others may be tested pursuant to the procedures stated hereinabove.

2. The Employer may test employees following thirty (30) days advance written notice to the employee(s) to be tested and to the applicable Union. Notice to the applicable Union shall be as set forth in Paragraph 3 above and such testing shall be pursuant to the procedures stated hereinabove.

3. The Employer may test an employee where the Employer has reasonable cause to believe that the employee is impaired from performing his/her job. Reasonable cause shall be defined as exhibiting aberrant or unusual behavior, the type of which is a recognized and accepted symptom of impairment (i.e., slurred speech, unusua1 lack of muscular coordination, etc.). Such behavior must be actually observed by at least two persons, one of whom shall be a Supervisor who has been trained to recognize the symptoms of drug abuse or impairment and the other of whom shall be the job steward. If the job steward is unavailable or there is no job steward on the project the other person shall be a member of the applicable Union's bargaining unit. Testing shall be pursuant to the procedures stated hereinabove. Employees who

are tested pursuant to the exceptions set forth in this paragraph and who test positive will be removed from the Employer's payroll.

g. Applicants or employees who do not test positive shall be paid for all time lost while undergoing drug testing. Payment shall be at the applicable wage and benefit rates set forth in the applicable Union's Master Labor Agreement. Applicants who have been dispatched from the Union and who are not put to work pending the results of a test will be paid waiting time until such time as they are put to work. It is understood that an applicant must pass the test as a condition of employment. Applicants who are put to work pending the results of a test will be considered probationary employees.

6. The employers will be allowed to conduct periodic job site drug testing on the Project under the following conditions:

a. The entire jobsite must be tested, including any employee or subcontractor's employee who worked on that project three (3) working days before or after the date of the test;

b. Jobsite testing cannot commence sooner than thirty (30) days after start of the work on the Project;

c. Prior to start of periodic testing, a business representative will be allowed to conduct an educational period on company time to explain periodic jobsite testing program to affected employees;

d. Testing shall be conducted by a SAMHSA certified laboratory, pursuant to the provisions set forth in Paragraph 5 hereinabove.

e. Only two periodic tests may be performed in a twelve month period.

7. It is understood that the unsafe use of prescribed medication, or where the use of prescribed medication impairs the employee's ability to perform work, is a basis for the Employer to remove the employee from the jobsite.

8. Any grievance or dispute which may arise out of the application of this Agreement shall be subject to the grievance and arbitration procedures set forth in the PLA.

9. The establishment or operation of this Policy shall not curtail any right of any employee found in any law, rule or regulation. Should any part of this Agreement be found unlawful by a court of competent jurisdiction or a public agency having jurisdiction over the parties, the remaining portions of the Agreement shall be unaffected and the parties shall enter negotiations to replace the affected provision.

10. Present employees, if tested positive, shall have the prerogative for rehabilitation program at the employee's expense. When such program has been successfully completed the Employer shall not discriminate in any way against the employee. If work for which the employee is qualified exists he/she shall be reinstated.

11. The Employer agrees that results of urine and blood tests performed hereunder will be considered medical records held confidential to the extent permitted or required by law. Such records shall not be released to any persons or entities other than designated Employer representatives and the applicable Union. Such release to the applicable Union shall only be allowed upon the signing of a written release and the information contained therein shall not be used to discourage the employment of the individual applicant or employee on any subsequent occasion.

12. The Employer shall indemnify and hold the Union harmless against any and all claims, demands, suits, or liabilities that may arise out of the application of this Agreement and/or any program permitted hereunder.

13. Employees who seek voluntary assistance for substance abuse may not be disciplined for seeking such assistance. Requests from employees for such assistance shall remain confidential and shall not be revealed to other employees or management personnel without the employee's consent. Employees enrolled in substance abuse programs shall be subject to all Employer rules, regulations and job performance standards with the understanding that an employee enrolled in such a program is receiving treatment for an illness.

14. This Memorandum, of Understanding shall constitute the only Agreement in effect between the parties concerning drug and alcohol abuse, prevention and testing. Any modifications thereto must be accomplished pursuant to collective bargaining negotiations between the parties.

# DRUG ABUSE PREVENTION AND DETECTION

## APPENDIX A

## CUTOFF LEVELS

| DRUG | SCREENING METHOD | SCREENING LEVEL ** | CONFIRMATION METHOD | CONFIRMATION LEVEL |
|---|---|---|---|---|
| Alcohol | EMIT | 0.02% | CG/MS | 0.02% |
| Amphetamines | EMIT | 1000 ng/m* | CG/MS | 500 ng/ml* |
| Barbiturates | EMIT | 300 ng/ml | CG/MS | 200 ng/ml |
| Benzodiazepines | EMIT | 300 ng/ml | CG/MS | 300 ng/ml |
| Cocaine | EMIT | 300 ng/ml* | CG/MS | 150 ng/ml* |
| Methadone | EMIT | 300 ng/ml | CG/MS | 100 ng/ml |
| Methaqualone | EMIT | 300 ng/ml | CG/MS | 300 ng/ml |
| Opiates | EMIT | 2000 ng/ml* | CG/MS | 2000 ng/ml* |
| PCP (Phencyclidine) | EMIT | 25 ng/ml* | CG/MS | 25 ng/ml* |
| THC (Marijuana) | EMIT | 50 ng/ml* | CG/MS | 15 ng/ml* |
| Propoxyphene | EMIT | 300 ng/ml | CG/MS | 100 ng/ml |

* SAMHSA specified threshold

** A sample reported positive contains the Indicated drug at or above the cutoff level for that drug. A negative sample either contains no drug or contains a drug below the cutoff level.

EMIT - Enzyme Immunoassay

CC/MS - Gas Chromatography/Mass Spectrometry

## SIDE LETTER OF AGREEMENT

## TESTING POLICY FOR DRUG ABUSE

It is hereby agreed between the parties hereto that an Employer who has otherwise properly implemented drug testing, as set forth in the Testing Policy for Drug Abuse, shall have the right to offer an applicant or employee a "quick" drug screening test. This “quick” screen test shall consist either of the “ICUP” urine screen or similar test or an oral screen test. The applicant or employee shall have the absolute right to select either of the two “quick” screen tests, or to reject both and request a full drug test.

An applicant or employee who selects one of the quick screen tests, and who passes the test, shall be put to work immediately. An applicant or employee who fails the “quick” screen test, or who rejects the quick screen tests, shall be tested pursuant to the procedures set forth in the Testing Policy for Drug Abuse. The sample used for the "quick" screen test shall be discarded immediately upon conclusion of the test. An applicant or employee shall not be deprived of any rights granted to them by the Testing Policy for Drug Abuse as a result of any occurrence related to the “quick” screen test.

Attachment C

## CITY OF LOS ANGELES HARBOR DEPARTMENT
## REQUEST/VERIFICATION FOR CRAFT EMPLOYEES
## (*INSERT NAME OF PROJECT*)

INSTRUCTIONS

To the Contractor:

Please complete and fax this form to the applicable union to request craft workers that fulfill all hiring requirements for the City of Los Angeles project. After faxing your request, call the Local to verify receipt and substantiate their capacity to furnish local, at-risk or general dispatch as requested. Contact information for Locals is listed on back of form. Please print your Fax Transmission Verification Report and keep a copy of this request for your records.

To the Union:

Please complete the "Union Use Only" section and fax form back to the requesting contractor. Retain form for your records.

| To: | Local | Fax# ( ) | Date: |
|---|---|---|---|
| From – Company Name | | | |
| Person Sending: | | Contact Phone: ( ) | |

Please provide me with union craft workers per the City of Los Angeles PLA that fulfills the requirements for this project as defined below:

30% Local Requirement (Union craft employees, including apprentices, who reside in the local metropolitan area zip codes listed below. If unavailable, can be dispatched from any one of the Citywide zip codes listed in Attachment).

SEE ATTACHED TIER 1 AND TIER 2 ZIP CODES

10% "Transitional Worker" Requirement (Union craft employees, including apprentices, who live in one of the Citywide zip codes listed in Attachment, and are certified to fulfill the "Transitional worker" hiring requirement).

General Dispatch (Union craft employees dispatched per normal dispatch procedures, not including the 30% Local or 10% Transitional Worker requirements)

| Employee Name | Address | Zip Code |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

| Craft Employees Requested | | | | | | |
|---|---|---|---|---|---|---|
| Job/Craft Description | Journeyman / Apprenticeship Level | Number(s) Requested | | | Report Date | Report Time |
| | | 30% Local | 10% Transitional | General Dispatch | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Total Workers Requested_____

Please have worker(s) report to the following address indicated below:

Site Address: _____ Report to (On-Site Contact): _____

On-Site Tel.#: ( ) _____ Fax: ( ) _____

Comments or special requirements:

**Union Use Only**

(Fax the Completed Form Back to Contractor)

Reception Date: Dispatch Date: Received By:

| Requested Dispatch | Available for Dispatch | Unavailable for Dispatch |
|---|---|---|
| 30% Local | ☐ | ☐ |
| 10% Transitional | ☐ | ☐ |
| General Dispatch | ☐ | ☐ |

Comments:

**ATTACHMENT D**

# Harbor Department PLA Construction Trade Unions Contact Numbers

**Asbestos Heat & Frost Insulators (Local 5)**
670 E. Foothill Blvd.
Azusa, CA 91702
Tel: (626) 815-9794
Fax: (626) 815-0165

**Boilermakers (Local 92)**
2260 S. Riverside Avenue
Bloomington, CA 92316
Tel: (909) 877-9382
Fax: (909) 877-8318

**Bricklayers & Allied Craftworkers (Loc. 4)**
11818 Clark St., Suite A
Arcadia, CA 91706
Tel: (626) 739-5600
Fax: (626) 739-5610

**Drywall Finishers Local 1136**
Corporate Center Drive
Monterey Park, CA 91754
Tel: (626) 296-8003
Fax: (626) 296-8076

**Electricians (Local 11)**
297 N. Marengo Avenue
Pasadena, CA 91101
Tel: (626) 243-9700
Fax: (626) 793-9743

**Elevator Constructors (Local 18)**
100 S. Mentor Avenue
Pasadena, CA 91106
Tel: (626) 449-1869
Fax: (626) 577-1055

**Operating Engineers (Local 12)**
150 E. Corson
Pasadena, CA 91103
Tel: (626) 792-8900
Fax: (626) 792-9039

**Glaziers (Local 636)**
1155 Corporate Center Dr.
Monterey Park, CA 91754
Tel: (626) 448-1565
Fax: (626) 797-8395

**Gunite Workers (Local 345)**
P.O. Box 3345
Burbank, CA 91508
Tel: (818) 846-1303
Fax: (818) 846-1226

**Iron Workers (Reinforced – Local 416)**
13830 San Antonio Dr.
Norwalk, CA 90650
Tel: (562) 868-1251
Fax: (562) 868-1429

**Iron Workers (Structural – Local 433)**
17495 Hurley St. East
City of Industry, CA 91744
Tel: (626) 964-2500
Fax: (626) 964-1754

**Laborers Local 1309**
3971 Pixie Ave.
Lakewood, CA 90712
Tel: (562) 421-9346
Fax: (562) 421-5964

**Laborers Local 300**
2005 W. Pico Blvd.
Los Angeles, CA 90006
Tel: (213) 385-3550
Fax: (213) 385-6985

**Painters & Allied Trades DC 36**
1155 Corporate Center Drive
Monterey Park, CA 91754
Tel: (626) 584-9925
Fax: (626) 584-1949

**Plaster Tenders**
1055 W. Second Street
Pomona, CA
Tel.: (909) 622-8500
Fax: (909) 623-5244

**Plumbers (Local 78)**
1111 West James Wood Boulevard
Los Angeles, CA 90015
(213) 688-9000
(213) 627-4624

**Pipe Trades (Local 250)**
*Steamfitters/Air Conditioning/ Refrigeration / Industrial Pipefitters*
18355 S. Figueroa St.
Gardena, CA 90248
*Steamfitters:* Tel: (310) 660-0035
Fax: (310) 329-2465
*AC/Refrig.* Tel: (310) 660-0045
FAX: (310) 329-2465

**Pipe Trades (Local 345)**
*Landscape, Irrigation, Underground & Specialty Piping*
1430 Huntington Dr.
Duarte, CA 91010
Tel: (626) 357-9345
Fax: (626) 359-0359

**Pipe Trades (Sprinkler Fitters – Local 709)**
12140 Rivera Road
Whittier, CA 90606
Tel: (562) 698-9909
Fax: (562) 698-7255

**Plasterers (Local 200)**
1610 W. Holt Ave.
Pomona, CA 91768
Tel: (909) 865-2240
Fax: (909) 865-9392

**Cement Masons #500**
1605 N. Susan St.
Santa Ana, CA 92703
Tel.: (714) 554-0730
Fax: (714) 265-0780

**Resilient Floor & Dec. Cov. (Local 1247)**
8051 Pioneer Blvd.
Whittier, CA 90606
Tel: (562) 695-7402
Fax: (562) 695-6337

**Roofers & Waterproofers (Local 36)**
5380 Poplar Blvd.
Los Angeles, CA 90032
Tel: (323) 222-0251
Fax: (323) 222-3585

**Sheet Metal Workers (Local 105)**
2120 Auto Centre Dr., Suite 105
Glendora, CA 91740
Tel: (909) 305-2800
Fax: (909) 305-2822

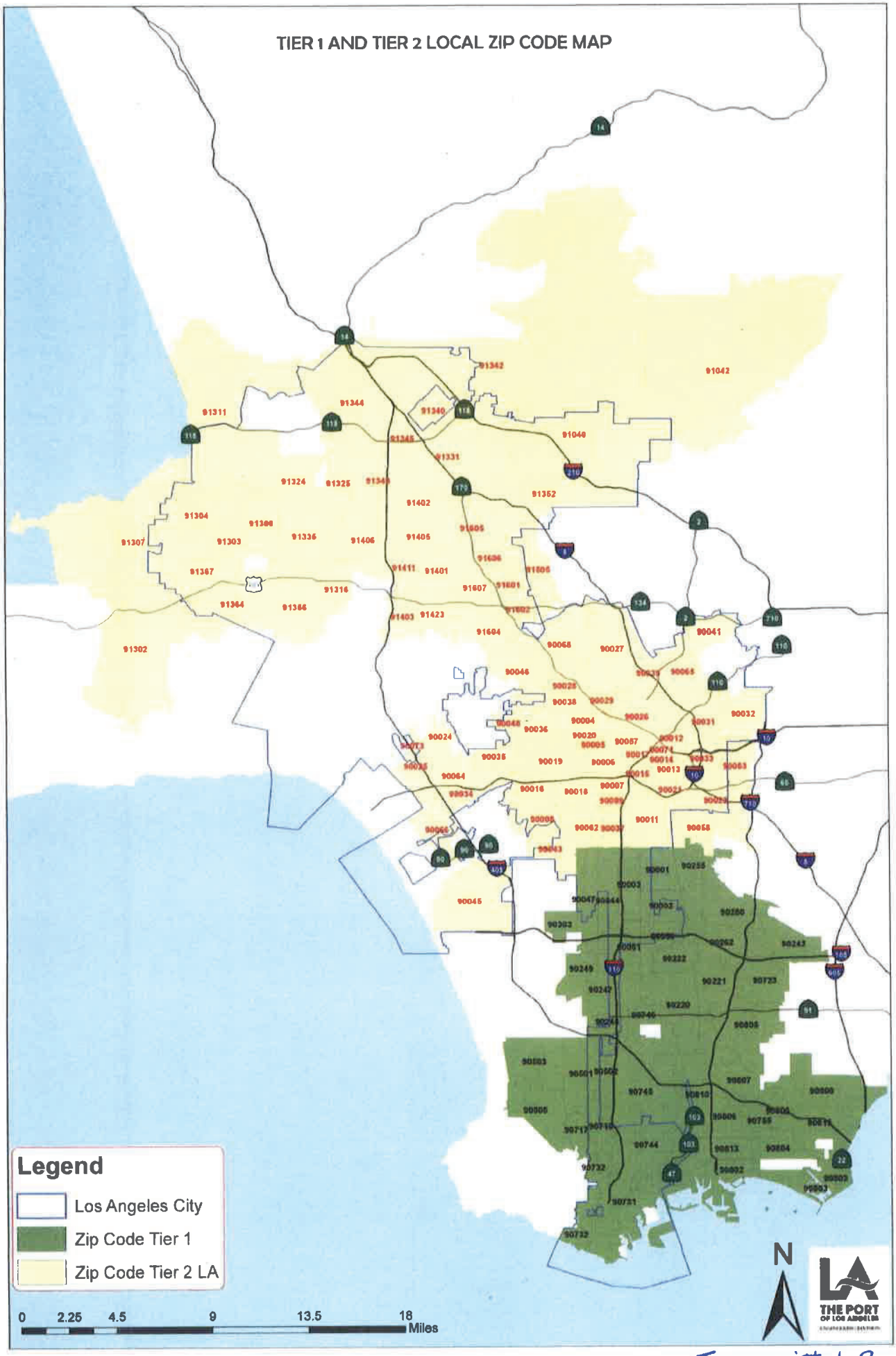
**Teamsters (Local 986)**
1198 Durfee Avenue
So. El Monte, CA 91733
Tel: (626) 350-9860
Fax: (626) 448-0986

**Tradeshow and Sign Crafts**
1155 Corporate Center Drive
Monterey Park, CA 91754
Tel: (626) 296-8086
Fax: (626) 584-1949

ATTACHMENT E
Harbor Department Calendar Years 2017 Thru 2027
Capital Improvement Program (CIP) Project List

| Project Title | Anticipated Start |
|---|---|
| 2017 - 2019 Site Improvements | 2017/2018 |
| B. 196-199 & 200A - Wharf Rehabilitation (2516600) | 2017/2018 |
| B. 212-224 - Intermodal Container Transfer Facility (ICTF) Expansion (2533300) | 2017/2018 |
| B. 93 - Cruise Terminal - Customs and Border Protection Improvements (2525300) | 2017/2018 |
| B.187-190 - MOTEMS Repairs (2524600) | 2017/2018 |
| Front Street Beautification (2504700) | 2017/2018 |
| North Gaffey Street Beautification -Phase II (7934500) | 2017/2018 |
| B. 240 A, B, & C - Seawall Improvements - ExxonMobil (2537600) | 2017/2018 |
| San Pedro Waterfront - Ports O' Call Promenade and Town Square (2532100) | 2017/2018 |
| B. 200 - Rail Yard and Track Connections Enhancements (2540800) | 2017/2018 |
| B. 214 - 220 - Concrete Wharf Improvements (2537800) | 2018/2019 |
| B. 167-169 - MOTEMS- Shell (2493600) | 2018/2019 |
| B. 226-236 Terminal Improvements - Wharf and Backlands (2531200) | 2018/2019 |
| B. 228-230 - Alternative Maritime Power (AMP) Upgrade and Retrofit (2529400) | 2018/2019 |
| Wilmington Waterfront Pedestrian Bridge (2537700) | 2018/2019 |
| Wilmington Waterfront Promenade (2533000) | 2018/2019 |
| San Pedro Waterfront - Sampson Way (7th St. to 22nd St.) Roadway Improvements (2488200) | 2018/2019 |
| 2018 - 2020 Marine Improvements | 2018/2019 |
| B. 148-151 - MOTEMS- Phillips 66 (2493800) | 2018/2019 |
| B. 238 - MOTEMS- ExxonMobil (2489900) | 2018/2019 |
| West Basin Lead Track Gap Closure (2536600) | 2018/2019 |
| B. 226-236- Terminal Infrastructure Reconstruction (2539400) | 2018/2019 |
| San Pedro Waterfront - Harbor Boulevard From Miner Street to SP Slip (2543000) | 2018/2019 |
| San Pedro Waterfront - B. 57 - Wharf Retrofit and Signal Street Improvements (2500600) | 2019/2020 |
| San Pedro Waterfront - B. 80-83 - Waterside Improvements (2539000) | 2019/2020 |
| 2019 - 2021 Site Improvements | 2019/2020 |
| B. 164 - MOTEMS - Valero (2493900) | 2019/2020 |
| B. 100-102 Marine Operations Building (2454300) | TBD |
| B. 100-102 Crane Maintenance Building (2502600) | TBD |
| B. 121-131 Wharf Upgrades (2449000) | TBD |
| B. 121-131 West Basin Intemodal Container Transfer Facility (WBICTF)(24810000) | TBD |
| RB 301-305 Buildings, Gates and Backland Development(2489000) | TBD |
| B. 306 Wharf and Backland Development (2489100) | TBD |
| B. 306 Alternative Maritime Power (AMP) (2506800) | TBD |
| B. 163 MOTEMS-NuStar (2493700) | TBD |
| B. 187-191 MOTEMS-Vopak (2494000) | TBD |
| B. 161 Marine Ways Modifications (2486100) | TBD |
| Harbor Administration Building-HVAC Replacement (2509600) | TBD |

All Projects on this list are subject to change. The anticipated starts are the best estimate at the time this document was prepared.




Transmittal 2




# CONSTRUCTION CAREERS POLICY

# (Revision 1)

## TABLE OF CONTENTS


| | | Page |
|---|---|---|
| Port of Los Angeles Construction Careers Policy | | |
| Section | | |
| I. | Definitions | 1-4 |
| II. | Coverage of Projects | 4 |
| III. | Implementation | 5 |
| IV. | Exclusions and/or Modifications | 5 |
| V. | Targeted Hiring | 5-6 |
| VI. | Responsibilities of Harbor Department, C/S/Es, Unions and Jobs Coordinator | 6-10 |
| VII. | Compliance | 10-11 |
| VIII. | Enforcement | 12-13 |
| IX. | Applicable Laws and Severability | 13 |

## SECTION I. DEFINITIONS

1. “Apprentice” means any worker who is indentured in a bona fide Labor/Management construction apprenticeship program, registered and approved by the State of California Department of Industrial Relations, Division of Apprenticeship Standards (DAS) or in the case of Projects with federal funding, indentured in a bona fide Labor/Management apprenticeship program approved by the US Department of Labor (DOL) and California DAS.

2. “Apprenticeship Program” means any Labor/Management construction apprenticeship program certified and approved by the California DAS or in the case of Projects with federal funding, approved by the US DOL and California DAS.

3. “Awarding Authority” means the City of Los Angeles, acting by and through the Board of Harbor Commissioners, or any employee or officer of the Board that is authorized to award or enter into any contract on behalf of the Board.

4 “Board” means the Los Angeles Board of Harbor Commissioners.

5. “Bureau of Contract Administration” (BCA) means the designated bureau within the City’s Department of Public Works which may provide support services to the Harbor Department in administering the Policy and the PLA.

6. “City” means the City of Los Angeles, a municipal corporation, and all City awarding authorities.

7. “Construction Contract” means a City contract which has been awarded by the Board, and is necessary to complete the Project.

8. “Contractor/Subcontractor/Employer (C/S/E)” means any individual firm, partnership, owner operator, or corporation, or combination thereof, including joint ventures, which is an independent business enterprise and has entered into a contract with the Harbor Department or any of its contractors or subcontractors/owner operators of any tier, with respect to the construction of any part of the Project(s) under contract terms and conditions approved by the Board.

9. “Core Worker” means a verifiable member of a C/S/E’s core workforce for the purpose of the PLA and this Policy if the worker’s name appears on the C/S/E’s active payroll for 60 of 100 working days immediately prior to award of the construction contract and meets all standards required by applicable local, state or federal law or regulation.

10. “Covered Project(s)” or “Project” means a project or projects that have been included in the Ten-Year “Capital Improvement Program (CIP) Project List” included as Attachment “E” to the PLA, or so designated by the Board. The Board may identify additional projects that are appropriate for coverage by the Agreement for

inclusion under the CIP and include such projects by Board Resolution. The Board shall request an annual review of the Harbor Department Capital Improvement Program to identify any new projects appropriate for coverage by the Agreement.

11. "Craft Request Form" means the document through which a C/S/E shall request workers from the Union and/or Jobs Coordinator, in the form set forth in the PLA and/or Policy.

12. "Employment Hiring Plan" (EHP) means a C/S/E's detailed hiring plan as described in BCA's Targeted Hiring Guidelines for Contractors and the Policy or other applicable Department policy.

13. "Engineer" means the Chief Harbor Engineer of the City of Los Angeles Harbor Department, Construction Division, or its authorized representative.

14. "Executive Director" shall mean the Executive Director of the City of Los Angeles Harbor Department, or his or her designee.

15. "FHWA Project" means a Harbor Department Project that is funded in whole or in part by the Federal Highway Administration (FHWA).

16. "Harbor Department" means the city of Los Angeles Harbor Department.

17. "Jobs Coordinator" means the Prime Contractor's designated person, agent or agency that will facilitate the local hire referral process with the C/S/E, Unions and other referral organizations, such as those listed in the BCA's Targeted Hiring Guidelines for Contractors. The Jobs Coordinator must be able to demonstrate or document to the BCA that it has the requisite qualification and/or experience to fulfill the duties and responsibilities as outlined in the Policy.

18. "LA/OCBTC" (Trades Council) means the Los Angeles /Orange Counties Building and Construction Trades Council.

19. "Letter of Assent" means the document that each C/S/E (of any tier) must sign and submit to the Engineer or designated administrator, which formally binds them to adherence to all the forms, requirements and conditions of the PLA and this Policy.

20. "Liquidated Damages" means disputed funds withheld from the Prime Contractor until they are found to be in compliance, the contract is terminated, or the Covered Project is completed.

21. "Local Resident" means an individual whose primary residence is within the Tier 1 or Tier 2 zip code areas.

22. "Long-Term Unemployment" as defined by the Bureau of Labor Statistics means being jobless for 21 weeks or more, as defined.

24. “PLA” means the Project Labor Agreement entered into between the Harbor Department of the City of Los Angeles and Unions, applicable to Covered Projects.

25. “Policy” means this Harbor Department Construction Careers Policy.

26. “Port” means the Port of Los Angeles.

27. “Project Work” means construction work performed as part of a Covered Project.

28. “Prime Contractor” means any individual firm, partnership, owner-operator, or corporation, or combination thereof, including joint-ventures, that is an independent business enterprise and that has entered into a Construction Contract with the Harbor Department.

29. “Reporting Period” means the Harbor Department’s indicated reporting period for measuring the targeted hiring efforts of the C/S/Es. These reporting periods shall be at the Harbor Department’s determination of 10%, 30%, 50%, 70% and 90% construction completion phases.

30. “Targeted Hiring Guidelines for Contractors” means the document provided by the Department to assist C/S/E’s in implementing the targeted hiring procedures.

31. “Tier 1” means the zip codes identified in Article 7.4 of the PLA, which fall within an approximate ten mile radius of the Port and in which the rate of unemployment is in excess of 105% of the County of Los Angeles’ unemployment rate at the time of application and/or are within the area of Port-related operations and activity.

32. “Tier 2” means the zip codes within the City, identified in Article 7.5 of the PLA, that includes at least 2 census tracts (or a portion thereof) in which the median annual household income is less than $62,627 per and/or where the rate of unemployment is in excess of 100% of the County of Los Angeles’ unemployment rate at the time of application.

33. “Transitional Worker” means any individual whose primary place of residence is within a Tier 1 or Tier 2 zip code of the City of Los Angeles, and who prior to commencing work on a project has been certified as satisfying at least one of the following criteria:

    (1) having a Veteran status; having a documented history of involvement with the criminal justice system; being homeless; or

    (2) is an individual facing two or more of the following barriers to employment: having a household income less than 50% of the Los Angeles County median annual household income, receiving public assistance, lacking a GED or high school diploma, being a custodial single parent, suffering from long term unemployment, being emancipated from the foster care system, or being an

apprentice, in a program described in Section I Number 1 above , with less than 15% of the apprenticeship hours required to graduate to journey level.

34. “Underemployment” means a situation in which a worker (i) is employed only part-time when one needs and desires full-time employment, and/or (ii) is inadequately employed at a low-paying job that requires less skill or training than one possesses.

35. “Unemployment” means, in accordance with the Bureau of Labor Statistics definition, a situation in which a person does not have a job, has actively looked for work in the prior4 weeks, and is currently available for work and chronic Unemployment means unemployment lasting 27 weeks or longer.

36. “Union(s)” or “Signatory Unions” means the Los Angeles/Orange Counties Building and Construction Trades Council affiliated with the Building & Construction Trades Department (AFL/CIO) Craft International Unions or any other craft labor organization signatory to the PLA, acting in their own behalf and on behalf of their respective affiliates and member organizations whose names are subscribed hereto and who have through their officers executed the PLA.

## SECTION II. COVERAGE OF PROJECTS

1. Covered Projects:

   (a) Except as provided otherwise herein, this Policy applies to all Covered Projects contained in the 10-Year CIP list, and awarded by the Board.

   (b) The Board may identify additional projects that are appropriate for coverage by the Policy and the PLA and include such projects by Board Resolution based on specific findings that such coverage will advance the Harbor Department’s legitimate proprietary and policy interests and promote the public interest in assuring completion of the project in question in a safe and cost-effective manner while minimizing or negating any adverse impact to the public welfare.

2. FHWA Projects: In the event that the Harbor Department determines that a project to which this Policy applies is an FHWA Project or other grant-funded project, the Department shall modify or not enforce any aspect of the Policy or PLA in accordance with a valid and binding instruction from the U.S. Department of Transportation or applicable funding authority.

## SECTION III. IMPLEMENTATION

Prior to bid, Harbor Department staff shall review each Covered Project's bid specifications to ensure the following provisions are incorporated:

1. That the Request for Bid Package Authorization from the Executive Director specifies that the Covered Project contains the PLA and this Policy;

2. That the Bid specifications require all contractors submitting bids or proposals agree to the terms of the PLA and this Policy;

3. That a provision exists in the prime contract obligating the Prime Contractor and all its C/S/Es (of any tier) to comply with the terms of the PLA and this Policy and require compliance with PLA and Policy terms through a Letter of Assent or any other form or legally enforceable obligation to the City.

4. That the Construction Contract shall include provisions establishing liquidated damages amounts as described in Section VIII of this Policy.

## SECTION IV. EXCLUSIONS AND/OR MODIFICATIONS

1. Funding Source: this Policy shall not apply to construction contracts or projects where the funding source has established provisions or rules that forbid the inclusion of a PLA and/or Local Hire provision. If the project is listed as part of the CIP, Harbor Department staff must present the reason(s) to the Board prior to final determination to exclude the Covered Project.

2. This Policy shall not apply to work performed by a C/S/E's executives, managerial employees, engineering employees, supervisors (except those covered by Schedule A collective bargaining agreements), office and clerical employees, or any other employee not performing construction craftwork.

3. Out-of-State Workers: hours worked by residents of states other than California shall not be included in calculation of total hours of project work for purposes of determining compliance with the Section 5 below.

## SECTION V. TARGETED HIRING

1. Requirements for Covered Projects:

   The Prime Contractor shall ensure that the following targeted hiring requirements are met for each Covered Project:

(a) At least 30% of total work hours on each project shall be performed by Local Residents residing within Tier 1 as described in Article 7.4 of the PLA. If the 30% local hire is not attained utilizing Tier 1, the outreach shall expand to the Tier 2 as described in Article 7.5 of the PLA.

(b) At least 20% of total work hours on each project will be performed by apprentices, but the hours performed by apprentices in each individual craft shall not exceed the ratio to journeymen established by the applicable craft union's DAS approved apprenticeship standards. The parties agree that residents in the Tier 1 or 2 zip code areas will perform 50% of all apprenticeship hours worked on the Project.

(c) At least 10% of total hours worked on each project shall be performed by Transitional Workers residing within Tier 1 or Tier 2 zip code areas described in Articles 7.4 and 7.5 of the PLA respectively and the remaining zip code areas within the City of Los Angeles. These hours shall be applied towards the 30% Local Resident targeted hiring.

## SECTION VI. RESPONSIBILITIES OF HARBOR DEPARTMENT, C/S/Es, UNIONS, and JOBS COORDINATOR

1. Harbor Department Responsibilities:

(a) Work with BCA or the Harbor Department's designated PLA administrator to monitor and enforce the targeted hiring measures of the PLA and Policy and issue Notices of Non-Compliance where appropriate.

(b) Review, approve or disapprove submitted Employment Hiring Plans prior to a C/S/E's estimated start of work. Approval of a C/S/E to work on a Covered Project is contingent on the C/S/E's submittal of an approved EHP.

(c) Ensure, prior to a C/S/E's approval to work on a Covered Project, its submittal of a duly signed Letter of Assent.

(d) Work with BCA or the Harbor Department's designated PLA administrator to post local hire status reports on the BCA website (http://bca.lacity.org) for Covered Projects.

(e) Inform the Board on a quarterly basis regarding the status of all Covered Projects.

(f) Determine any withholding from payments as disputed funds and make recommendations for assessment of Liquidated Damages.

2. Prime Contractor and C/S/Es:

   (a) Employment Hiring Plan (EHP): Prime Contractor shall ensure that its C/S/Es (of any tier), at least 20 business days prior to starting their work on the Covered Project, shall submit their plan(s) to the Harbor Department for approval by the Executive Director or his/her designee. Each C/S/E shall include in its EHP a description of how it will meet the targeted hiring requirements set forth in the PLA and Policy. No C/S/E (of any tier) shall be approved to work on a Covered Project without an approved EHP.

   (b) PLA and Policy: Prime Contractor shall ensure that its C/S/Es (of any tier), prior to start of work, (i) read and understand the requirements of the PLA and Policy; (ii) submit their Employment Hiring Plans at least 20 business days prior to their subcontractors' start of work and (iii) sign and submit their Letters of Assent prior to start of work. No C/S/E (of any tier) shall be approved to work on a Covered Project without having submitted a signed Letter of Assent.

   (c) Prior to start of work on the project, the Prime Contractor shall:

      (i) Recommend a Jobs Coordinator for approval by the Harbor Department.

      (ii) Upon Department's approval of its Jobs Coordinator, notify its subcontractor (of any tier) who the Jobs Coordinator is.

      (iii) Provide within 10-calendar days upon request by the Department or its designated representative, documentation of their Jobs Coordinator's qualifications.

   (d) The Prime Contractor and its C/S/Es (of any tier) shall coordinate with the Jobs Coordinator for services to support their efforts in meeting the targeted hiring percentages as described in Article 7 of the PLA and Section 5 of the Policy.

   (e) Pre-Job Conference: The Prime Contractor and its C/S/Es (of any tier), prior to start of work, shall hold a pre-job conference. The purpose of the pre-job conference is to determine craft personnel needs, schedule of work for the contract and all other matters as described in the PLA and the Policy. All work assignments shall be disclosed by the Prime Contractor and/or C/S/Es (of any tier) at the pre-job conference. Any formal jurisdictional dispute(s) raised under Article 14 of the PLA must be raised at the pre-job conference upon disclosure of the work assignments. If the Prime Contractor and/or C/S/Es intend to change the work assignment after the pre-job conference or to make an assignment of work not previously known, the Prime Contractor and/or C/S/Es must notify the appropriate affected craft union(s) prior to the commencement of work.

(f) Craft Request Form: The Prime Contractor and its C/S/Es (of any tier) shall only use the Craft Request Form (Attachment “C” of the PLA) and the procedures written therein to request workers from the affected Union(s). All C/S/Es must transmit a concurrent Craft Request transmittal of such request to the Jobs Coordinator.

(g) The Prime Contractor and its C/S/Es (of any tier) must satisfactorily document their contact with the Jobs Coordinator when the Unions have not been able to refer a Local Resident and/or Transitional Worker within the 48-hour window of referral.

(h) The Prime Contractor and its C/S/Es (of any tier) shall maintain proof of transmittal of the Craft Request forms to the Union hiring halls and Jobs Coordinator. Upon request by the Harbor Department or its designated representative, copies shall be provided within 10-calendar days of request.

(i) The Prime Contractor and its C/S/Es (of any tier) shall make available to the Harbor Department, BCA, or designated representatives, records and information that are deemed relevant to monitoring and enforcement of the provisions of the PLA and the Policy.

(j) The Prime Contractor and its C/S/Es (of any tier) shall cooperate fully and promptly with any inquiry or investigation the Harbor Department, BCA or designated representatives deem necessary in order to monitor compliance with the provisions of the PLA and the Policy.

(k) The Prime Contractor and its C/S/Es (of any tier), within 60 calendar days after concluding work on the Covered Project, shall submit to the Harbor Department a verified statement of the number of journeypersons and apprentices who worked on the project, their classifications and the hours worked (per California Labor Code 1777.5(e)).

**Upon request of the BCA, or the Harbor Department, the Prime Contractor and its C/S/Es (of any tier) must provide documentation of their Local Resident, Apprentice and Transitional Workers targeted hiring participation level efforts within 10-calendar days of the request for documentation.**

3. Union Responsibilities:

(a) Ensure that its dispatchers properly adhere to the use of the Craft Request Form and the procedures written therein.

(b) Refer Local Residents and/or Transitional Workers requested through the Craft Request Form regardless of their place on the hiring hall list and normal referral procedures.

(c) Exert their best efforts to recruit and identify Local Residents residing in Tier 1, and then Tier 2 zip code areas, as well as those referred by the Jobs Coordinator for entrance, indentureship into a union apprenticeship program, and assisting such individuals in graduating into eligible journeypersons.

(d) Upon receiving a request from a C/S/E for a Local Resident, exhaust the available list of individuals residing the Tier 1 zip codes before referring an individual residing in the Tier 2 zip codes.

(e) Track retention of Local Residents and/or Transitional Worker apprentices participating in joint Labor/Management apprenticeship programs and provide the Harbor Department with the necessary information as requested.

4. Jobs Coordinator:

(a) Criteria for Selecting a Jobs Coordinator: The Jobs Coordinator plays an integral part in the success of its partners in obtaining the targeted hiring percentages. It is the responsibility of the Prime Contractor to designate a Jobs Coordinator possessing, but not limited to, the following demonstrable experience and qualifications:

(i) Developing, creating, designing and marketing specific programs targeting Local Residents and/or Transitional Workers for construction opportunities at the Covered Project (e.g. handouts and fliers for “walk-ins” demonstrating program entrance procedures).

(ii) Coordinating services for contractors to assist in their local worker, transitional worker and apprentice utilization.

(iii) Educating and assisting contractors on incentives provided by State or federal programs for On-the-Job Training and employer tax credits.

(iv) Conducting orientations, job fairs and community outreach meetings to the local community.

(v) Providing supportive services such as skills training, child care, transportation, education remediation, assistance with union fees and tools.

(vi) Screening and certifying the Transitional Worker status of workers.

(vii) Establishing a referral and retention tracking mechanism for placed local and/or transitional workers and apprentices.

(viii) Networking with the various Work Source Centers, community and faith based organizations and other non-profit entities that provide qualified local workers and/or transitional workers.

(ix) Liaising with the various building trades crafts for referral and placement of local hire and/or transitional workers.

(b) Jobs Coordinator Responsibilities. The Jobs Coordinator shall:

(i) Coordinate the local hire referral process with the C/S/Es, Unions, City Work Source Centers, Faith and Community Based Organizations, and other organizations that can provide qualified local hire referrals.

(ii) Certify the Transitional Worker status.

(iii) Maintain a database of pre-qualified Local Residents for referral to work on a Covered Project and/or indentureship into a bona fide Labor/Management apprenticeship program.

(iv) Facilitate relationships among approved apprenticeship programs and the C/S/Es to enable prompt referral.

(v) Be the point of contact to provide information about available job opportunities on Covered Projects.

(vi) Educate and provide financial incentives information to the C/S/Es whom hire eligible workers under Work Opportunity Tax Credit (WOTC) and On-the-Job Training (OJT) and other benefits for which a C/S/E may be eligible based on their implementation of the Local Hire requirements.

(vii) Assist the C/S/Es with their local hire effort documentations and other reports as it relates to their Local Resident and/or Transitional Worker targeted hiring requirements.

(viii) Work closely with Harbor Department staff, the building trades and C/S/Es in achieving the targeted hiring.

**Parties with responsibilities under the PLA and/or Policy, shall maintain those responsibilities regardless of the performance of the Jobs Coordinator at the tasks described in the PLA and the Policy.**

## SECTION VII. COMPLIANCE

The Harbor Department or its authorized representatives shall determine whether a Prime Contractor and its C/S/Es have complied with the requirements of the PLA and the Policy. The Prime Contractor is ultimately responsible for its and its C/S/Es (of any tier) compliance with the PLA and Policy requirements.

In determining compliance with the Apprentice Targeted Hiring, project hours performed by trades who do not have approved training under Chief of the Division of apprenticeship standards, and/or do not have written apprentice agreements under Chapter 4(commencing with Section 3070) will be excluded in calculations determining compliance with the Targeted Hiring requirements as applicable.

1. If, after the Harbor Department or its authorized representatives takes into account all applicable hours of Project Work performed up to that point in time of the Reporting Period, the targeted hiring requirements of the PLA and Policy have been satisfied for a Project, then the Prime Contractor and its subcontractors (of any tier) working on that Project shall be deemed to be in compliance.

2. If the targeted hiring requirements of the PLA and the Policy have not been satisfied for a Project, the Prime Contractor nonetheless may be deemed to be in compliance if it demonstrates both (a) that it and each of its C/S/Es (of any tier) have complied with all other requirements of the PLA and the Policy, and (b) that it and each C/S/E (of any tier) have either (i) satisfied the targeted hiring requirements of the PLA and this Policy with regard to the Project Work that it has performed or (ii) satisfactorily demonstrated the following:

    (a) Adherence to procedures contained in its Employment Hiring Plan as approved by the Harbor Department.

    (b) Requests to Unions, through Craft Request Forms, of sufficient numbers of Local Residents and Transitional Workers to meet the targeted hiring percentages set forth in Section 5 of the Policy for that C/S/E's Project Work.

    (c) Documented contact with the Jobs Coordinator in each instance when the relevant Union did not refer qualified Local Residents or Transitional Workers within the 48 hours following the C/S/E's request and the C/S/E's fair consideration of any Local Resident or Transitional Worker subsequently referred by the Jobs Coordinator.

    (d) Accurate records documenting the C/S/E's compliance efforts that include (but are not limited to):

        (i) A listing by name and address of all local recruitment sources contacted by the C/S/E;

        (ii) The date of the local recruitment contact and the identity of the person contacted, the trade and classification and number of hire referrals requested;

        (iii) The number of Local Residents and/or Transitional Workers hires made as a result of the contact;

(iv) The identity and address of the worker(s) hired pursuant to the contact;

(v) (v) Documentation when a referral was not hired (reason for non-hire) and/or premature termination.

## SECTION VIII. ENFORCEMENT

The Prime Contractor for every Project agrees:

1. To be liable to the Harbor Department for Liquidated Damages as provided in this section;

2. That the Prime Contractor and its C/S/Es (of any tier) commitment to comply with the targeted hiring requirements of PLA and Policy is a material element of the Covered Project;

3. That the failure of the Prime Contractor and its C/S/Es (of any tier) to comply with the targeted hiring requirements in accordance with Section VII of this Policy will cause harm to the Harbor Department and the public which is significant and substantial but extremely difficult to quantify. The harm to the City includes the difficult-to-quantify harm that the community and its families suffer as a result of high unemployment and concentrated poverty;

4. Liquidated Damages: Due to the difficulty of estimation of damages for violation(s) of requirements of this Policy, Construction Contracts shall have provisions establishing liquidated damage to be assessed as follows:

   (a) The Prime Contractor shall pay liquidated damages equal to the average journeyperson project wage for each applicable work hour the Project fell short of the targeted hiring, or $200 per day, whichever is greater. When more than one targeted hiring requirement is not in compliance, the liquidated damages will not be assessed cumulatively; however, the highest violation will govern.

   (b) If the Covered Project's targeted hiring requirements are out of compliance during any Reporting Period, the Prime Contractor shall meet with the Harbor Department or their designated representative to develop a recovery plan for compliance. The Prime Contractor has until the next Reporting Period to effectuate the recovery compliance plan or Liquidated Damages shall be withheld.

   (c) Before Liquidated Damages are sought, the Prime Contractor shall be notified of the proposed Liquidated Damages and served with a summary of the information upon which the Liquidated Damages are based.

   (d) Liquidated Damages shall be withheld from all subsequent monthly progress payment request(s) as disputed funds until such time as Prime Contractor is

found to be in compliance, the Covered Project contract is terminated, or the Covered Project is completed.

(e) Should the Covered Project be terminated or completed before the Prime Contractor is found to be in compliance, the Engineer will evaluate the data and determine if Liquidated Damages are recommended. If the Engineer recommends assessment of Liquidated Damages, then the amount of the Liquidated Damages shall be returned to the fund from whence they came.

5. Liquidated Damages Appeal:

(a) A Prime Contractor that has received a Liquidated Damages assessment letter, which includes the targeted hiring data and Liquidated Damages calculations, may send a written appeal to the Engineer, within fourteen(14) calendar days. The Prime Contractor shall provide documentation supporting the appeal of the assessment.

(b) A meeting with the Engineer, Harbor Department staff, and the Prime Contractor will be held to present any relevant information. The Prime Contractor will be allowed to provide evidence that it has made all of the showings required under Section 7 of the Policy during the meeting. The decision of the Engineer on the Liquidated Damages assessment shall be final when rendered. The Contractor shall be notified of the final decision in writing by the Engineer.

(c) Failure to submit a written request for an appeal within the time frame stipulated in this Section will be deemed a waiver of the right to appeal and the recommendation for assessment of Liquidated Damages will be implemented.

6. Termination of Contract(s): Consistent, substantial violations of the PLA and/or this Policy by any Prime Contractor and/or C/S/E may result in a recommendation to the Board that the contract of the offending Prime Contractor and/or C/S/E be terminated per Section 00405 of the Master General Conditions.

## SECTION IX. APPLICABLE LAW AND SEVERABILITY

The provisions of this Policy shall not be applicable where prohibited by federal or state law, or where the application would violate or be inconsistent with the terms and conditions of a grant or a contract with an agency of the United States or the State of California, or the valid instructions of an authorized representative of any of these agencies with respect to any grant or contract. If enforcement of any provision of this Policy is enjoined by an court of competent jurisdiction, the remaining provisions shall remain in full force and effect.

# APPENDIX "B"

# RAILROAD FLAGGING AGREEMENT, FLAGGING POLICY, AND RATE SCHEDULE

*For PHL Use Only*
Job Code:_____ Job Name:_____
Company Name: _____
Branch/MP:_____ Work Start Date: _____

**Pacific Harbor Line, Inc. (PHL)**

# Railroad Flagging Agreement

**Today's Date:**_____ **PHL Permit No*:** _____

**Permit Holder:**_____

***BE ADVISED - A valid Right-of-Entry (ROE) Permit is required for any activity on the PHL Right-of-Way.***
*If you do not have a valid PHL ROE permit, please contact the PHL Roadmaster at (310) 984-5778*

## REQUESTING PARTY INFORMATION:

Name:_____ Company:_____

Phone:(___)_____ Cell:(___)_____ Email:_____

Onsite Contact *(if different from above)*:_____ Cell:(___)_____

## BILLING INFORMATION:

***Flagging is billed at the rates listed in the PHL Flagging Policy & Rate Schedule (attached hereto).***

Billing Contact Name & Company: _____

Billing Address:_____ City:_____ State:_____ Zip:_____

Company Phone: (___)_____ Fax: (___)_____

## PROJECT INFORMATION:

Work Days – Check all that apply *It will take 14 calendar days to schedule flagging, please plan accordingly*

☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday

Estimated Start Date:_____ Estimated Completion Date:_____

Shift Start/End Times:_____ Total Duration (days/hours):_____

Location (including PHL Branch & Milepost, if known): _____

Description of work (including number of personnel and type of equipment): _____

_____

_____

## ACKNOWLEDGEMENT:

This Railroad Flagging Agreement and attached Rate Schedule set forth the terms and conditions for PHL's provision of flagging and related services to the Requesting Party. In consideration of the premises and mutual covenants contained herein PHL and the Requesting Party agree to be bound by the terms in this Agreement.

Requesting Party Signature: _____ Date:_____

PHL Signature: _____ Date: _____

# PHL Flagging Policy & Rate Schedule

**Timing of Requests:** Any request from a Requesting Party shall be submitted fourteen (14) calendar days in advance of any work within twenty (20) feet of nearest rail.

**Safety Policy:** A PHL flagman will be required when equipment is within ten (10) feet from the track centerline. This includes any equipment in the vicinity with the potential to tip over or encroach within ten (10) feet of the nearest rail. A PHL watchman may be required when men or equipment is within twenty (20) feet from the nearest rail. Once the request has been approved, the flagman/watchman shall be provided by PHL at the cost of the Requesting Party.

**Cost:** The 2025 cost of the flagman/watchman is $969.00 per 8-hour shift. **The minimum assignment for a flagman is one (1) eight (8) hour shift. For any shift that extends beyond 8 hours, up to a maximum of 12 hours, there is a flat fee of $1,102.00.**

**Cancellation:** Any cancelations must be **submitted in writing to PHL at** jrodriguez@anacostia.com a minimum of 48 hours in advance of the scheduled day of flagging or the Requesting Party will be charged for all shifts that were originally scheduled.

**Contact:** The PHL contact is Jose Rodriguez (310-984-5778). Please return a signed copy of this Flagging Agreement to jrodriguez@anacostia.com.

**Insurance:** **Requesting Party will not be allowed to enter PHL controlled property until a valid ROE agreement and the required certificate of insurance for the work/project are provided to Jose Rodriguez.**

## PHL Flagman Rate Schedule

**For any minimum 8-hour shift (Mon-Sun), the rates are as follows:**

| | |
|---|---|
| Calendar Year 2025: | $969.00 |
| Calendar Year 2026: | $1008.00 |
| Calendar Year 2027: | $1048.00 |

**For any shift (Mon-Sun) that extends beyond 8 hours, up to a maximum of 12 hours, the all-inclusive rates as follows:**

| | |
|---|---|
| Calendar Year 2025: | $1,102.00 |
| Calendar Year 2026: | $1146.00 |
| Calendar Year 2027: | $1192.00 |

PHL's Flagging Rates are determined by the Operating Permit with the City of Los Angeles, dated December 1, 1997, as amended, and the Operating Agreement with the City of Long Beach, dated June 1, 1998, as amended. (See Section 12.4 and 2nd Amendment Section 8.7). Each rate increase is directly correlated to the standard five-year labor agreement currently in effect through the end of the calendar year 2027.

# APPENDIX "C"

# MITIGATION MEASURES, MONITORING, AND REPORTING

# Mitigation Monitoring and Reporting Forms for the Avalon Pedestrian Bridge and Promenade Gateway

# Spec No. 2804A

- **MM AQ-3: On-Road Trucks Used During Construction**
- **MM AQ-4: Non-Road Construction Equipment (except vessels, harbor craft, on-road trucks, and dredging equipment).**
- **MM AQ-5: Additional Fugitive Dust Controls**
- **MM AQ-6: Best Management Practices**
- **MM AQ-7: General Mitigation Measure**
- **MM AQ-8: Special Precautions near Sensitive Sites**
- **MM AQ-9: Construction Recycling**
- **MM AQ-13: Solid Waste Measures**
- **MM CR-2: Generate Monitoring/Treatment Plan Prior to Demolition for all Ground Disturbing Activities**
- **MM CR-3: Stop Work if Previously Unidentified Resources Are Encountered during Ground Disturbing Activities**
- **MM CR-4: Develop a Program to Mitigate Impacts on Nonrenewable Paleontologic Resources prior to Excavation or Construction of any Proposed Project Components**
- **MM GW-1. Adherence to Soil Management Plan and/or Phase II Environmental Site Assessments**
- **MM GW-2: Site Remediation**
- **MM GW-2b: Remediate Soil along Existing and Former Rail Lines**
- **MM GW-3: Asbestos-Containing Materials and Lead-Based Paint**
- **MM NOI-1: Noise**
- **MM TC-1: Develop and implement a Traffic Control Plan throughout proposed project construction**
- **MM UT-3: Recycling of Construction Materials**
- **MM UT-4: Recycled Content Materials Use**

**MM AQ-3: On-Road Trucks Used During Construction**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

On-road trucks shall comply with EPA 2010 on-road emission standards or better, unless the contractor provides a written finding and obtains written approval from the Harbor Department agreeing that such equipment is unavailable. A written finding must demonstrate that one of the following circumstances exist:

1. A piece of specialized equipment is unavailable, in a controlled form, or within the required Tier level, within the state of California, including through a leasing agreement.

2. A contractor has applied for necessary incentive funds to put controls on a piece of uncontrolled equipment planned for use on the project, but the application process is not yet approved, or the application has been approved, but funds are not yet available.

3. A contractor has ordered a control device for a piece of equipment planned for use on the project, or the contractor has ordered a new piece of controlled equipment to replace the uncontrolled equipment, but that order has not been completed by the manufacturer or dealer. In addition, for this exemption to apply, the contractor must attempt to lease controlled equipment to avoid using uncontrolled equipment, but no dealer within 200 miles of the project has the controlled equipment available for lease.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**MM AQ-4: Non-Road Construction Equipment (except vessels, harbor craft, on-road trucks, and dredging equipment).**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

All non-road construction equipment greater than 50 hp must meet EPA Tier 4 emission standards, unless the contractor provides a written finding consistent with project contract or lease management requirements and obtains written approval from the Lead Agency that such equipment is unavailable.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____
Name and Title of Responsible Person

_____ _____
Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____
Name and Title of Responsible Person

_____ _____
Signature Date

**MM AQ-5: Additional Fugitive Dust Controls**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

The calculation of fugitive dust (PM10) from proposed project earth-moving activities assumes a 61% reduction from uncontrolled levels to simulate rigorous watering of the site and use of other measures.

- Temporary traffic controls such as a flag person will be provided in conformance with the California Manual of Uniform Traffic Control Devices during all phases of construction to maintain smooth traffic flow.
- Construction activities that affect traffic flow on the arterial system will be conducted during off-peak hours to the extent practicable.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**MM AQ-6: Best Management Practices**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

The following types of measures for construction equipment (including onroad trucks) will be used where applicable and feasible:

1. Maintain a minimum buffer zone of 300 meters between truck traffic and sensitive receptors wherever feasible.
2. Enforce truck parking restrictions.
3. Provide on-site services to minimize truck traffic in or near residential areas, including, but not limited to, the following services: meal or cafeteria services, etc.
4. Re-route construction trucks away from congested streets or sensitive receptor areas.
5. Use electric power in favor of diesel power where available.
6. Provide temporary traffic controls such as a flag person, in conformance with the California Manual of Uniform Traffic Control Devices during all phases of construction to maintain smooth traffic flow.
7. Schedule construction activities that affect traffic flow on the arterial system for off-peak hours, to the extent possible.
8. Provide dedicated turn lanes as needed for movement of construction trucks and equipment on- and off site.
9. Configure construction parking to minimize traffic interference.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**MM AQ-7: General Mitigation Measure**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

For any of the above mitigation measures (MM AQ-1 and MM AQ-3 through AQ-6), if a CARB-certified technology becomes available that is as good as or better than the existing measure in terms of emissions reductions, the technology could replace the existing measure pending approval by LAHD.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____
Name and Title of Responsible Person

_____ _____
Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____
Name and Title of Responsible Person

_____ _____
Signature Date

**MM AQ-8: Special Precautions near Sensitive Sites**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

All construction activities located within 1,000 feet of sensitive receptors (defined as schools, playgrounds, daycares, and hospitals), will notify each of these sites in writing at least 30 days prior to construction activity.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____
Name and Title of Responsible Person

_____ _____
Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____
Name and Title of Responsible Person

_____ _____
Signature Date

**MM AQ-9: Construction Recycling**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

Demolition and/or excess construction materials will be separated on-site for reuse/recycling or proper disposal. During grading and construction, separate bins for recycling of construction materials will be provided on site. Materials with recycled content will be used in project construction. Chippers on site during construction will be used to further reduce excess wood for landscaping cover.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____
Name and Title of Responsible Person

_____ _____
Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____
Name and Title of Responsible Person

_____ _____
Signature Date

**MM AQ-13: Solid Waste Measures**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).

Provide interior and exterior storage areas for recyclables and green waste and adequate recycling containers in public areas.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____
Name and Title of Responsible Person

_____ _____
Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____
Name and Title of Responsible Person

_____ _____
Signature Date

**MM CR-2: Generate Monitoring/Treatment Plan Prior to Demolition for all Ground Disturbing Activities**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

Prior to any ground-disturbing activities and/or demolition, including along the Waterfront Red Car Line and within the vicinity of the Government Depot portion of the Wilmington Waterfront District, a treatment/monitoring plan would be generated. This document shall address areas where potentially significant historical archaeological deposits are likely to be located within the proposed commercial portion of the project area. The treatment plan/monitoring shall also include methods for: (1) archaeological monitoring during demolition of existing buildings (2) subsurface testing after demolition and (3) data recovery of archaeological deposits. A detailed historic context that clearly demonstrates the themes under which any identified subsurface deposits would be determined significant would be included in the document as well as anticipated artifact types, artifact analysis, report writing, repatriation of human remains and associated grave goods, and curation.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The Construction Manager/Contractor shall instruct construction personnel as part of normal construction regarding the treatment plan and procedures of to halt/redirect construction activities if any materials are uncovered that are suspect of being associated with historical or prehistoric occupation. If materials are found, the construction contractor shall contact the Construction Manager, EMD, the archeologist and/or the County Coroner. The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**MM CR-3: Stop Work if Previously Unidentified Resources Are Encountered during Ground Disturbing Activities**

**Project Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

In the event that any artifact or an unusual amount of bone, shell, or nonnative stone is encountered during construction, work will be immediately stopped and relocated to another area. The contractor will stop construction within 100 feet of the exposed resource until a qualified archaeologist can be retained by the Port to evaluate the find (see 36 CFR 800.11.1 and CCR, Title 14, Section 15064.5(f)). Examples of such cultural materials might include concentrations of ground stone tools such as mortars, bowls, pestles, and manos; chipped stone tools such as projectile points or choppers; flakes of stone not consistent with the immediate geology such as obsidian or fused shale; historic trash pits containing bottles and/or ceramics; or structural remains. If the resources are found to be significant, they will be avoided or will be mitigated consistent with SHPO Guidelines. All construction equipment operators will attend a preconstruction meeting presented by a professional archaeologist retained by the Port that will review types of cultural resources and artifacts that would be considered potentially significant, to ensure operator recognition of these materials during construction.

Prior to beginning construction, the Port will meet with applicable Native American Groups, including the Gabrieliño/Tongva Tribal Council to identify areas of concern. In addition to monitoring, a treatment plan will be developed in conjunction with the Native American Groups to establish the proper way of extracting and handling all artifacts in the event of an archaeological discovery.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The Construction Manager/Contractor shall instruct construction personnel as part of normal construction procedures to halt/redirect construction activities if any materials are uncovered that are suspect of being associated with historical or prehistoric occupation. If materials are found, the construction contractor shall contact the Construction Manager, EMD, or the archeologist. The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**MM CR-4: Develop a Program to Mitigate Impacts on Nonrenewable Paleontologic Resources prior to Excavation or Construction of any Proposed Project Components**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

This mitigation program will be conducted by a qualified vertebrate paleontologist and will be consistent with the provisions of CEQA, as well as the proposed guidelines of the Society of Vertebrate Paleontology.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The Construction Manager/Contractor shall instruct construction personnel as part of normal construction procedures to halt/redirect construction activities if any materials are uncovered that are suspect of being associated with historical or prehistoric occupation. If materials are found, the construction contractor shall contact the Construction Manager, EMD, or the archeologist. The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**MM GW-1. Adherence to Soil Management Plan and/or Phase II Environmental Site Assessments**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

LAHD will prepare a soil management plan prior to construction and will implement it during all phases of construction. Disturbed soils will be monitored for visual evidence of contamination (e.g., staining or discoloration). Soil will also be monitored for the presence of VOCs using appropriate field instruments such as organic vapor measurement with photoionization detectors or flame ionization detectors. If the monitoring procedures indicate the possible presence of contaminated soil, a contaminated soil contingency plan will be implemented and will include procedures for segregation, sampling, and chemical analysis of soil will be implemented. These same procedures for unexpected discovery of unidentified USTs, hazardous materials, petroleum hydrocarbons, or hazardous or solid wastes encountered will be included in the soil management plan as well.[1]

In the event unexpected suspected chemically impacted material (soil or water) is encountered during construction, the contractor will notify LAHD's Chief Harbor Engineer, the Director of Environmental Management, and Risk Management's Industrial Hygienist. Continuation of work or implementation of any remedial action will require approval by the Chief Harbor Engineer. Contaminated soil will be profiled for disposal and will be transported to an appropriate hazardous or non-hazardous waste or recycling facility licensed to accept and treat the type of waste indicated by the profiling process. The soil management plan, including handling of contaminated soil, contingency plan will be developed and in place during all construction activities. If construction generates any contaminated groundwater that must be disposed of outside of the dewatering/NPDES process, the groundwater will be profiled, manifested, hauled, and disposed of in the same manner.

Alternatively, preparation of a Phase II ESA will be prepared on parcels where soil, soil vapor, groundwater data are not available.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: Soil and groundwater remediation shall be completed such that contamination levels are below health screening levels based on human health risk assessments and/or applicable action levels established by the lead regulatory agency with jurisdiction over the site. Soil contamination waivers may be acceptable as a result of encapsulation (i.e., paving) and/or human health risk assessments, but would be subject to the discretion of the lead regulatory agency. The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

[1] Soil management plan was prepared by the LAHD as detailed in Specification No. 2804A Section 02 61 14 for the Avalon Pedestrian Bridge and Promenade Gateway.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**MM GW-2: Site Remediation**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

Unless otherwise authorized by the lead regulatory agency for any given site, LAHD will conduct a health risk assessment and remediate all contaminated soils within proposed project boundaries prior to or during demolition and grading activities.[1]

Remediation will occur in compliance with local, state, and federal regulations as described in Section 3.6.3 of the Wilmington Waterfront Project Environmental Impact Report and as directed by the LACFD, DTSC, and/or RWQCB.[2]

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: Soil and groundwater remediation shall be completed such that contamination levels are below health screening levels based on human health risk assessments and/or applicable action levels established by the lead regulatory agency with jurisdiction over the site. Soil contamination waivers may be acceptable as a result of encapsulation (i.e., paving) and/or human health risk assessments, but would be subject to the discretion of the lead regulatory agency. The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

[1] A Risk Assessment was prepared by the LAHD for the Avalon Pedestrian Bridge and Promenade Gateway Project.

[2] Remediation activities shall be undertaken in accordance with the soil management plan prepared by the LAHD as detailed in Specification No. 2804A Section 02 61 14 for the Avalon Pedestrian Bridge and Promenade Gateway.

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**MM GW-2b: Remediate Soil along Existing and Former Rail Lines**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

Soil along and immediately adjacent to existing and former rail lines that will be disturbed during construction have been assessed for the presence of volatile organic compounds, petroleum hydrocarbons, and metals. A soil management plan, as described in MM GW-1, will be implemented for soil generating from the construction activities along and adjacent to the rail lines.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: Soil and groundwater remediation shall be completed such that contamination levels are below health screening levels based on the human health risk assessments and/or applicable action levels established by the lead regulatory agency with jurisdiction over the site. Soil contamination waivers may be acceptable as a result of encapsulation (i.e., paving) and/or human health risk assessments, but would be subject to the discretion of the lead regulatory agency. The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**MM GW-3: Asbestos-Containing Materials and Lead-Based Paint**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

Prior to construction activities, and in accordance with applicable laws and regulations, LAHD, or its contractor, will conduct an evaluation of all buildings (built prior to 1980) to be demolished to evaluate the presence of asbestos-containing building materials and lead-based paint. Remediation will be implemented in accordance with the recommendations of these evaluations.[1]

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

[1] Asbestos remediation activities shall be undertaken in accordance with the surveys prepared by the LAHD as detailed in Specification No. 2804A Section 02 82 13 for the Avalon Pedestrian Bridge and Promenade Gateway.

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**MM NOI-1: Noise**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

The following procedures will help reduce noise impacts from construction activities:

a) Temporary Noise Barriers. When construction occurs within 500 feet of a residence or park, temporary noise barriers (solid fences or curtains) will be located between noise-generating construction activities and sensitive receptors.

b) Construction Hours. Construction will be limited to between 7:00 a.m. and 6:00 p.m. on weekdays; between 8:00 a.m. and 6:00 p.m. on Saturdays; and there will be no construction equipment noise anytime on Sundays. If extended construction hours are needed during weekdays under special circumstances, the LAHD and contractor will provide at least 72 hours notice to Banning's Landing Community Center. Under no circumstances will construction hours exceed the range prescribed by the City of Los Angeles Municipal Code.

c) Construction Days. Noise-generating construction activities will not occur on weekends or holidays unless critical to a particular activity (e.g., concrete work).

d) Construction Equipment. All construction equipment powered by internal combustion engines will be properly muffled and maintained.

e) Idling Prohibitions. Unnecessary idling of internal combustion engines near noise sensitive areas will be prohibited.

f) Equipment Location. All stationary noise-generating construction equipment, such as air compressors and portable power generators, will be located as far as practical from existing noise sensitive land uses.

g) Quiet Equipment Selection. Quiet construction equipment will be selected whenever possible. Where feasible, noise limits established in the City of Los Angeles Noise Ordinance will be fully complied with.

h) Notification. Sensitive receptors including residences within 2,000 feet of the proposed project site will be notified of the construction schedule in writing prior to the beginning of construction.

i) Reporting. The LAHD through the Construction Contractor will clearly post the telephone number where complaints regarding construction-related disturbance can be reported.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**MM TC-1: Develop and implement a Traffic Control Plan throughout proposed project construction**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

In accordance with the City's policy on street closures and traffic diversion for arterial and collector roadways, the construction contractor will prepare a traffic control plan (to be approved by City and County engineers) before construction.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The construction contractor(s) will prepare a construction traffic control plan to be approved by LAHD Engineering and LADOT, detailing methods to minimize traffic congestion and access restrictions during construction. The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**MM UT-3: Recycling of Construction Materials**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

Demolition and/or excess construction materials will be separated on site for reuse/recycling or proper disposal. During grading and construction, separate bins for recycling of construction materials will be provided on site.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____
Name and Title of Responsible Person

_____ _____
Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____
Name and Title of Responsible Person

_____ _____
Signature Date

**MM UT-4: Recycled Content Materials Use**

**Project: Avalon Pedestrian Bridge and Promenade Gateway**

**Contractor:** _____

**Application for Port Project Number**: 160720-109

**State Clearinghouse Number**: 2008031065

**SECTION I: MITIGATION MEASURE:**

Materials with recycled content, such as recycled steel from framing and recycled concrete and asphalt from roadway construction, will be used in project construction. Wood chippers registered through the California Air Resources Board's Portable Equipment Registration Program will be used on site during construction, using wood from tree removal, not from demolished structures, to further reduce excess wood for landscaping cover.

**Mitigation Monitoring Frequency**: At start of construction and throughout construction.

**Mitigation/Reporting Requirement**: The contractor shall comply with this mitigation measure, and submit verification documents to the Engineer.

Standard Environmental Controls will be implemented in the daily operations based on existing local, state and federal laws.

**SECTION II: COMPLIANCE COMMITMENT (PRIOR TO COMMENCING CONSTRUCTION):**

By signing below, the contractor certifies that it will comply with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring and reporting requirements. In compliance with the mitigation measure, all applicable verification documents will be provided to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

**SECTION III: COMPLIANCE VERIFICATION (AT CONSTRUCTION COMPLETION):**

By signing below, the contractor certifies that it has complied with the mitigation measure identified in Section I: Mitigation Measure and all mitigation monitoring reporting requirements, including submitting all applicable verification documents to the Engineer.

_____

Name and Title of Responsible Person

_____ _____

Signature Date

# APPENDIX "D"

# ENVIRONMENTAL COMPLIANCE TRACKING (ECT) FORM

THE PORT OF LOS ANGELES

# Environmental Compliance Tracking (ECT) Form

PORT OF LOS ANGELES CONSTRUCTION DIVISION

## Avalon Pedestrian Bridge and Promenade Gateway

**SPECIFICATION No. 2804A** **CONTRACT No. ####**

| Contractor | | | ECT No.: | |
|---|---|---|---|---|

## Section I: Equipment Information

| Equipment Description | Equipment Make and Model No. | Est. Hours on Project |
|---|---|---|
| | | |

| | | | |
|---|---|---|---|
| On-Road Equipment ☐ | Engine Model Year | License Plate No. | |

| | | | | | |
|---|---|---|---|---|---|
| Non-Road Construction Equipment ☐ | Tier Level | CARB EIN | Engine Family Name | Executive Order No. (Attach Form) | |
| Harbor Craft Equipment ☐ | Tier Level | CARB UVI | Engine Family Name | Fleet Operator | |

## Section II: Compliance Status

Does the above piece of equipment comply with the environmental measures, including but not limited to regulatory compliance certifications, mitigation measures and project conditions, set forth in the contract? ***If no, please state circumstance in Section III.***

Yes ☐ No ☐

## Section III: Non-Compliance Circumstance

| | |
|---|---|
| ☐ | A piece of specialized equipment is unavailable, in a controlled form, or within the required Tier level, within the state of California, including through a leasing agreement. |
| ☐ | Contractor has applied for necessary incentive funds to put controls on a piece of uncontrolled equipment planned for use on the project, but the application process is not yet approved, or the application has been approved, but funds are not yet available. |
| ☐ | Contractor has ordered a control device for a piece of equipment planned for use on the Project, or Contractor has ordered a new piece of controlled equipment to replace the uncontrolled equipment, but that order has not been completed by the manufacturer or dealer. In addition, for this exemption to apply, the Contractor must attempt to lease controlled equipment to avoid using uncontrolled equipment, but no dealer within 200 miles of the Project has the controlled equipment available for lease. |

## Section IV: Steps Taken (Explain Below)

*I certify to the best of my knowledge that the above information is true and in accordance with the contract requirements.*

Signature _____ Date _____

SUBMIT FORM ONLINE



Edited on 07/17/2024

# APPENDIX "E"

# WASTE MANAGEMENT PLAN (WMP) AND SOLID WASTE DIVERSION AND DISPOSAL (SWDD) REPORT FORMS

**ATTACHMENT A - INSTRUCTION SHEET FOR WASTE MANAGEMENT PLAN**

1. For assistance, contact the Solid Resources Citywide Recycling Division of LA Sanitation & Environment at (213) 485-3460 or sansrcrd_cdrecycling@lacity.org.
2. Please print very clearly or type.
3. Waste Management Plan (WMP) is to be completed and approved prior to start of construction. Along with the WMP, the Contractor is to include a copy of the waste hauler's waste hauler permit.
4. Attachment A includes**:** **Part 1-**Inert Debris and **Part 2**-Metal, Wood, C&D waste, and all other materials.
5. Must meet ≥80% recycling rate in **Part 1** – Inert Debris such as concrete, asphalt, dirt, rock, and brick.
6. Must meet ≥65% recycling rate in **Part 2** – Metal, wood, green waste, C&D waste, and all other materials.
7. The information required includes but is not limited to, the following:
    a. Contractor and project work order number.
    b. Permitted solid waste hauler(s) and permit number(s).
    c. Facility names and addresses that are to process the C&D materials.
    d. Estimated quantities of **all** C&D materials listed in **tons**.
    e. Verify whether the Waste Management Plan meets the minimum recycling requirement of 80% for inert debris in Part 1. Verify whether the Waste Management Plan meets the minimum recycling requirement of and 65% for other C&D waste.
8. **Calculating recycling and disposal for mixed C&D waste taken to a certified processing facility: the total tons taken to certified processing facility times the recycling rate = amount to be recycled. Total tons taken to facility minus amount to be recycled = amount for disposal. E.g. 100 tons x 0.80 (80% recycling rate) = 80 tons diverted and 20 tons disposed.

# ATTACHMENT A

## WASTE MANAGEMENT PLAN (PART 1-INERT DEBRIS)

| Project Title: | W. O. Number: | Date Submitted: |
|---|---|---|
| Name & Title of Responsible Person: | Signature: | |
| Permitted Waste Hauler Name(s) and Permit No(s): | | |

| Material | Facility Name and Address | Tons Diverted | Tons Disposed |
|---|---|---|---|
| **RECYCLING/REUSE** | | | |
| Asphalt | | | |
| Concrete | | | |
| Brick | | | |
| Dirt | | | |
| Mixed Inerts | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **DISPOSAL** | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **DIVERSION AND DISPOSAL TOTALS =** | | | |

Percent Recycling = $\frac{\text{Total diversion}}{\text{Total diversion + Total disposed}}$ X 100 =

Percent Recycling = $\frac{\quad}{+}$ X 100 = %

Does Part 1 (Inert Debris) of this Waste Management Plan meet the minimum recycling requirement of 80% for Inert Debris?

YES ☐ NO ☐

# ATTACHMENT A

## WASTE MANAGEMENT PLAN (PART 2-ALL OTHER C&D WASTE)

| W. O. No.: | Date Submitted: |
|---|---|

Contractors Name:

Street address:

City, State, Zip:

Phone: Fax: Email:

Permitted Waste Hauler Name(s) and Permit No(s):

| Material | Facility Name and Address | Tons Diverted | Tons Disposed |
|---|---|---|---|
| **RECYCLING/REUSE** | | | |
| Glass | | | |
| Wood/Greenwaste | | | |
| Metal | | | |
| Cardboard | | | |
| Other (Describe) | | | |
| **DISPOSAL** | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **CERTIFIED PROCESSING**** | | | |
| Mixed C&D Waste | | | |
| Mixed C&D Waste | | | |
| **DIVERSION AND DISPOSAL TOTALS =** | | | |

$$\text{Percent Recycling} = \frac{\text{Total Diversion}}{\text{Total Diversion} + \text{Total Disposed}} \times 100 =$$

$$\text{Percent Recycling} = \frac{\qquad}{+} \times 100 = \quad \%$$

Does Part 2 (All Other C&D Waste) of this Waste Management Plan meet the minimum recycling requirement of 65% for all other C&D Waste? YES ☐ NO ☐

****Recycling tonnages for mixed C&D waste taken to a certified processing facility = total tonnage x recycling rate. Remaining tonnage counts as disposal. Example: 200 tons x 0.80 = 160 tons diverted and 40 tons disposed.**

# EXAMPLE WASTE MANAGEMENT PLAN
# ATTACHMENT A
## WASTE MANAGEMENT PLAN (PART 1-INERT DEBRIS)

| Project Title: *Big Street Overcrossing* | W. O. Number: *XYZ12345* | Date Submitted: *01/01/2020* |
|---|---|---|
| Name & Title of Responsible Person: *Bobby Lee, Project Manager* | Signature: *Bobby Lee* | |
| Permitted Waste Hauler Name(s) and Permit No(s): *Grava Gravel Haulers, PER-22-333* | | |

| Material | Facility Name and Address | Tons Diverted | Tons Disposed |
|---|---|---|---|
| **RECYCLING/REUSE** | | | |
| Asphalt | *Inert Recycling Facility A,888 Valle Valley, CA 12345* | *600* | |
| Concrete | *Inert Recycling Facility A,888 Valle Valley, CA 12345* | *55* | |
| Brick | *Inert Recycling Facility B, 777 Valle Valley,CA 12345* | *6* | |
| Dirt | *The Landscaping Co., 222 Valle Valley, CA 12345* | *200* | |
| Mixed Inerts | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **DISPOSAL** | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **DIVERSION AND DISPOSAL TOTALS =** | | *861* | |

$$\text{Percent Recycling} = \frac{\text{Total diversion}}{\text{Total diversion} + \text{Total disposed}} \times 100 =$$

$$\text{Percent Recycling} = \frac{861}{861 + 0} \times 100 = 100.00\ \%$$

Does Part 1 (Inert Debris) of this Waste Management Plan meet the minimum recycling requirement of 80% for Inert Debris?

YES ☒ NO ☐

# ATTACHMENT A

## WASTE MANAGEMENT PLAN (PART 2-ALL OTHER C&D WASTE)

| W. O. No.: XYZ12345 | Date Submitted: 01/01/2020 |
|---|---|

Contractors Name: Awesome Engineering Contractors

Street address: Circular Drive

City, State, Zip: *Ciudad City, CA 12345*

Phone: (123) 456-7891 Fax: (321) 123-4567 Email: AEC@zmail.com

Permitted Waste Hauler Name(s) and Permit No(s):

| Material | Facility Name and Address | Tons Diverted | Tons Disposed |
|---|---|---|---|
| **RECYCLING/REUSE** | | | |
| Glass | | | |
| Wood/Greenwaste | *The Landscaping Co., 222 Valle Valley, CA 12345* | *50* | |
| Metal | *Kim Loai Metal Recycling, 333 Camino St, CA 12345* | *6* | |
| Cardboard | | | |
| Other (Describe) | | | |
| **DISPOSAL** | | | |
| Other (Describe) | *Municipal Landfill, 456 Montana Mountains, CA 12345* | | *15* |
| Other (Describe) | | | |
| **CERTIFIED PROCESSING**** | | | |
| Mixed C&D Waste | *Certified Processor A (Recycling Rate = 75% = 0.75)* | *18.75* | *6.25* |
| Mixed C&D Waste | *25 tons x 0.75 = 18.75 tons recycled and 6.25 tons disposed* | | |
| | **DIVERSION AND DISPOSAL TOTALS =** | *74.75* | *21.25* |

$$\text{Percent Recycling} = \frac{\text{Total Diversion}}{\text{Total Diversion} + \text{Total Disposed}} \times 100 =$$

$$\text{Percent Recycling} = \frac{74.75}{74.75 + 21.25} \times 100 = 77.86\ \%$$

Does Part 2 (All Other C&D Waste) of this Waste Management Plan meet the minimum recycling requirement of 65% for all other C&D Waste? YES ☒ NO ☐

****Recycling tonnages for mixed C&D waste taken to a certified processing facility = total tonnage x recycling rate. Remaining tonnage counts as disposal. Example: 200 tons x 0.80 = 160 tons diverted and 40 tons disposed.**

**ATTACHMENT B - INSTRUCTION SHEET FOR SOLID WASTE DIVERSION & DISPOSAL REPORT**

1. For assistance, contact the Solid Resources Citywide Recycling Division of LA Sanitation & Environment at (213) 485-3460 or sansrcrd_cdrecycling@lacity.org.
2. Please print very clearly or type.
3. All **three (3) pages** of Attachment B and **all** manifests, weight tickets, receipts, reports, invoices, and other supporting documents specifically identifying the projects, the recyclables and solid waste generated by the project, and where the material was sent must be submitted to the inspector with each application for progress payment.
4. Attachment B includes**: Part 1** - Inert Debris, **Part 2** - All Other C&D Waste, **Part 3** - Project Cumulative Total.
5. Must meet ≥80% recycling rate for Inert Debris by end of construction.
6. Must meet ≥65% recycling rate in Metal, wood, green waste, C&D waste, and all other materials by end of construction.
7. In **Part 1 and Part 2,** record:
    a. Material type generated.
    b. Permitted solid waste hauler(s) and permit number(s).
    c. Facility names and addresses where materials were delivered.
    d. Tons diverted/disposed for a particular pay period.
    e. Verify whether Part 1 meets the minimum recycling requirement of 80% for Inert Debris. Verify whether Part 2 meets the minimum recycling requirement of 65% for other C&D Waste. Contractor is to meet the minimum recycling requirements by the end of construction.
8. In **Part 3**, record:
    a. Pay period beginning and period ending
    b. Diversion and disposal for the pay period and cumulative diversion and disposal for the project
    c. Cumulative waste generated (diversion + disposal) for the project
    d. Cumulative recycling rate for the project (diverted/generated)*100
9. The information required includes but is not limited to, the following:
    a. Contractor and project identification information
    b. Actual quantities of **all** materials listed in tons
10. Source-separated material taken to a recycling facility or certified processing facility is 100% recycled.
11. **Calculating recycling and disposal for mixed material taken to a certified processing facility: the total tons taken to certified processing facility times the recycling rate = amount to be recycled. Total taken to facility minus amount to be recycled = amount for disposal. E.g. 100 tons x 0.80 (80% recycling rate) = 80 tons diverted and 20 tons disposed.

# ATTACHMENT B

## SOLID WASTE DIVERSION AND DISPOSAL REPORT
## PART 1 OF 3 - INERT DEBRIS

| Project Title: | W. O. Number: | Date Submitted: | Progress Payment # |
|---|---|---|---|
| Company Name: | Daytime Phone Number: | | |
| Period Covered In This Report:<br>From: | To: | | |
| Permitted Waste Hauler Name(s) and Permit No(s): | | | |

| Material | Facility Name and Address | Tons diverted | Tons Disposed |
|---|---|---|---|
| **RECYCLING/REUSE** | | | |
| Asphalt | | | |
| Concrete | | | |
| Brick | | | |
| Dirt | | | |
| Mixed Inerts | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **DISPOSAL** | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **DIVERSION AND DISPOSAL TOTALS * =** | | | |

***Copy the Tons Diverted and Tons Disposed totals to Part 3 Project Cumulative Total. Each Report needs to have the totals from every previous Diversion and Disposal Report documented on it, as well as the totals from this Report.**

# ATTACHMENT B

## SOLID WASTE DIVERSION AND DISPOSAL REPORT

## PART 2 OF 3 - ALL OTHER C&D WASTE

| W. O. Number: | Date Submitted: |
|---|---|

Permitted Waste Hauler Name(s) and Permit No(s):

| Material | Facility Name and Address | Tons Recycled | Tons Disposed |
|---|---|---|---|
| **RECYCLING/REUSE** | | | |
| Metal | | | |
| Wood / Lumber | | | |
| Greenwaste / Landscaping | | | |
| Glass | | | |
| Cardboard | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **DISPOSAL** | | | |
| Mixed Solid Waste | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **CERTIFIED PROCESSING**** | | | |
| Mixed C&D Waste | | | |
| Mixed C&D Waste | | | |
| Mixed C&D Waste | | | |
| **DIVERSION AND DISPOSAL TOTALS*** **=** | | | |

***Copy the Tons Diverted and Tons Disposed totals to Part 3 Project Cumulative Total. Each Report needs to have the totals from every previous Diversion and Disposal Report documented on it, as well as the totals from this Report.**

****Recycling tonnages for mixed C&D waste taken to a certified facility = total tonnage x recycling rate. Remaining tonnage counts as disposal. Example: 200 tons x 0.80 = 160 tons diverted and 40 tons disposed.**

# ATTACHMENT B

## SOLID WASTE DIVERSION AND DISPOSAL REPORT

## PART 3 OF 3 - PROJECT CUMULATIVE TOTAL

| W. O. Number: | | | | Date Submitted: | | | |
|---|---|---|---|---|---|---|---|
| Period Beginning | Period Ending | *Period Diversion | Cumulative Project Diversion, **R** | *Period Disposal | Cumulative Project Disposal, **D** | Cumulative Waste **G**enerated **R + D** | Cumulative Recycling % (**R**/**G**)100 |
| **INERT DEBRIS CUMULATIVE PROJECT HISTORY, REFER TO ATTACHMENT B PART 1 OF 3** | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **ALL OTHER C&D WASTE CUMULATIVE PROJECT HISTORY, REFER TO ATTACHMENT B PART 2 OF 3** | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Does this Report meet the minimum recycling requirement of 80% for Inert Debris and 65% for All Other C&D Waste? Contractor is to meet the minimum recycling requirements of 80% for Inert Debris and 65% for All Other C&D Waste by the end of construction.

YES ☐ NO ☐

| Name & title of person responsible for the information in this form: | Signature: |
|---|---|

***From appropriate Part 1 or 2 during each period.**

**Each Attachment B Part III Report needs to have the Tons Diverted and Tons Disposed from every previous Diversion and Disposal Report documented in it, as well as the totals from this Report. Attach another Part III form and continue information if more rows are needed.**

# EXAMPLE SOLID WASTE DIVERSION AND DISPOSAL REPORT FOR PROGRESS PAYMENT #1

## ATTACHMENT B

### SOLID WASTE DIVERSION AND DISPOSAL REPORT

### PART 1 OF 3 - INERT DEBRIS

| Project Title: *Big Street Overcrossing* | W. O. Number: *XYZ12345* | Date Submitted: *03/15/2020* | Progress Payment # *1* |
|---|---|---|---|
| Company Name: *Awesome Engineering Contractors* | | Daytime Phone Number: *(123)456-7891* | |
| Period Covered In This Report: From: *2/1/2020* | | To: *2/28/2020* | |
| Permitted Waste Hauler Name(s) and Permit No(s): *Grava Gravel Haulers, PER-22-333* | | | |

| Material | Facility Name and Address | Tons diverted | Tons Disposed |
|---|---|---|---|
| **RECYCLING/REUSE** | | | |
| Asphalt | *Inert Recycling Facility A,888 Valle Valley, CA 12345* | *45* | |
| Concrete | *Inert Recycling Facility A,888 Valle Valley, CA 12345* | *10* | |
| Brick | *Inert Recycling Facility B, 777 Valle Valley, CA 12345* | *6* | |
| Dirt | *The Landscaping Co., 222 Valle Valley, CA 12345* | *150* | |
| Mixed Inerts | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **DISPOSAL** | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **DIVERSION AND DISPOSAL TOTALS * =** | | *211* | |

***Copy the Tons Diverted and Tons Disposed totals to Part 3 Project Cumulative Total. Each Report needs to have the totals from every previous Diversion and Disposal Report documented on it, as well as the totals from this Report.**

# ATTACHMENT B

## SOLID WASTE DIVERSION AND DISPOSAL REPORT

## PART 2 OF 3 - ALL OTHER C&D WASTE

| W. O. Number: *XYZ12345* | Date Submitted: *03/15/2020* |
|---|---|

Permitted Waste Hauler Name(s) and Permit No(s): *Grava Gravel Haulers, PER-22-333*

| Material | Facility Name and Address | Tons Recycled | Tons Disposed |
|---|---|---|---|
| **RECYCLING/REUSE** | | | |
| Metal | *Kim Loai Metal Recycling, 333 Camino St, CA 12345* | *2* | |
| Wood / Lumber | *The Landscaping Co., 222 Valle Valley, CA 12345* | *15* | |
| Greenwaste / Landscaping | | | |
| Glass | | | |
| Cardboard | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **DISPOSAL** | | | |
| Mixed Solid Waste | *Municipal Landfill, 456 Montana Mountains, CA 12345* | | *1* |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **CERTIFIED PROCESSING**** | | | |
| Mixed C&D Waste | *Certified Facility A (Recycling Rate = 75% = 0.75)* | *9* | *3* |
| Mixed C&D Waste | *12 tons x 0.75 = 9.00 tons recycled and 3.00 tons disposed* | | |
| Mixed C&D Waste | | | |
| Mixed C&D Waste | | | |
| | **DIVERSION AND DISPOSAL TOTALS* =** | *26* | *4* |

***Copy the Tons Diverted and Tons Disposed totals to Part 3 Project Cumulative Total. Each Report needs to have the totals from every previous Diversion and Disposal Report documented on it, as well as the totals from this Report.**

****Recycling tonnages for mixed C&D waste taken to a certified facility = total tonnage x recycling rate. Remaining tonnage counts as disposal. Example: 200 tons x 0.80 = 160 tons diverted and 40 tons disposed.**

# ATTACHMENT B

## INERT SOLID WASTE DIVERSION AND DISPOSAL REPORT

## PART 3 OF 3 - PROJECT CUMULATIVE TOTAL

| W. O. Number: *XYZ12345* | | | | Date Submitted: *03/15/2020* | | | |
|---|---|---|---|---|---|---|---|
| Period Beginning | Period Ending | *Period Diversion | Cumulative Project Diversion, **R** | *Period Disposal | Cumulative Project Disposal, **D** | Cumulative Waste **G**enerated **R + D** | Cumulative Recycling % (**R**/**G**)100 |
| **INERT DEBRIS CUMULATIVE PROJECT HISTORY, REFER TO ATTACHMENT B PART 1 OF 3** | | | | | | | |
| *2/1/2020* | *2/28/2020* | *211* | *211* | *0* | *0* | *211* | *100(211/211)= 100.00* |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **ALL C&D OTHER WASTE CUMULATIVE PROJECT HISTORY, REFER TO ATTACHMENT B PART 2 OF 3** | | | | | | | |
| *2/1/2020* | *2/28/2020* | *26* | *26* | *4* | *4* | *26+4=30* | *100(26/30)= 86.67* |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Does this Report meet the minimum recycling requirement of 80% for Inert Debris and 65% for All Other C&D Waste? Contractor is to meet the minimum recycling requirements of 80% for Inert Debris and 65% for All Other C&D Waste by the end of construction.

YES ☒ NO ☐

| Name & title of person responsible for the information in this form: *Bobby Lee, Project Manager* | Signature: *Bobby Lee* |
|---|---|

***From appropriate Part 1 or 2 during each period.**

**Each Attachment B Part III Report needs to have the Tons Diverted and Tons Disposed from every previous Diversion and Disposal Report documented in it, as well as the totals from this Report.**

**Attach another Part III form and continue information if more rows are needed.**

# EXAMPLE SOLID WASTE DIVERSION AND DISPOSAL REPORT FOR PROGRESS PAYMENT #2

## ATTACHMENT B

### SOLID WASTE DIVERSION AND DISPOSAL REPORT

### PART 1 OF 3 - INERT DEBRIS

| Project Title: *Big Street Overcrossing* | W. O. Number: *XYZ12345* | Date Submitted: *04/15/2020* | Progress Payment # *2* |
|---|---|---|---|
| Company Name: *Awesome Engineering Contractors* | Daytime Phone Number: *(123)456-7891* | | |
| Period Covered In This Report: From: *3/1/2020* | To: *3/31/2020* | | |
| Permitted Waste Hauler Name(s) and Permit No(s): *Grava Gravel Haulers, PER-22-333* | | | |

| Material | Facility and Location | Tons diverted | Tons Disposed |
|---|---|---|---|
| **RECYCLING/REUSE** | | | |
| Asphalt | *Inert Recycling Facility A,888 Valle Valley, CA 12345* | | |
| Concrete | *Inert Recycling Facility A,888 Valle Valley, CA 12345* | *300* | |
| Brick | *Inert Recycling Facility B, 777 Valle Valley, CA 12345* | | |
| Dirt | *The Landscaping Co., 222 Valle Valley, CA 12345* | *100* | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **DISPOSAL** | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **DIVERSION AND DISPOSAL TOTALS * =** | | *400* | |

***Copy the Tons Diverted and Tons Disposed totals to Part 3 Project Cumulative Total. Each Report needs to have the totals from every previous Diversion and Disposal Report documented on it, as well as the totals from this Report.**

# ATTACHMENT B

## SOLID WASTE DIVERSION AND DISPOSAL REPORT

## PART 2 OF 3 - ALL OTHER C&D WASTE

| W. O. Number: *XYZ12345* | Date Submitted: *04/15/2020* |
|---|---|

Permitted Waste Hauler Name(s) and Permit No(s): *Grava Gravel Haulers, PER-22-333*

| Material | Facility and Location | Tons Recycled | Tons Disposed |
|---|---|---|---|
| **RECYCLING/REUSE** | | | |
| Metal | *Kim Loai Metal Recycling, 333 Camino St, CA 12345* | *1* | |
| Wood / Lumber | *The Landscaping Co., 222 Valle Valley, CA 12345* | *16* | |
| Greenwaste / Landscaping | | | |
| Glass | | | |
| Cardboard | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **DISPOSAL** | | | |
| Mixed Solid Waste | *Municipal Landfill, 456 Montana Mountains, CA 12345* | | *1* |
| Other (Describe) | | | |
| Other (Describe) | | | |
| Other (Describe) | | | |
| **CERTIFIED PROCESSING**** | | | |
| Mixed C&D Waste | *Certified Processor A (Recycling Rate = 75% = 0.75)* | *7.5* | *3.5* |
| Mixed C&D Waste | *10 tons x 0.75 = 7.5 tons recycled and 2.5 tons disposed* | | |
| Mixed C&D Waste | | | |
| Mixed C&D Waste | | | |
| **DIVERSION AND DISPOSAL TOTALS* =** | | *24.5* | *4.5* |

***Copy the Tons Diverted and Tons Disposed totals to Part 3 Project Cumulative Total. Each Report needs to have the totals from every previous Diversion and Disposal Report documented on it, as well as the totals from this Report.**

****Recycling tonnages for mixed C&D waste taken to a certified facility = total tonnage x recycling rate. Remaining tonnage counts as disposal. Example: 200 tons x 0.80 = 160 tons diverted and 40 tons disposed.**

# ATTACHMENT B

## INERT SOLID WASTE DIVERSION AND DISPOSAL REPORT

## PART 3 OF 3 - PROJECT CUMULATIVE TOTAL

| W. O. Number: *XYZ12345* | Date Submitted: *04/15/2020* |
|---|---|

| Period Beginning | Period Ending | *Period Diversion | Cumulative Project Diversion, **R** | *Period Disposal | Cumulative Project Disposal, **D** | Cumulative Waste **G**enerated **R + D** | Cumulative Recycling % (**R**/**G**)100 |
|---|---|---|---|---|---|---|---|
| **INERT DEBRIS CUMULATIVE PROJECT HISTORY, REFER TO ATTACHMENT B PART 1 OF 3** | | | | | | | |
| *2/1/2020* | *2/28/2020* | *211* | *211* | *0* | *0* | *211* | *100(211/211)= 100.00* |
| *3/1/2020* | *3/31/2020* | *400* | *211+400=611* | *0* | *0* | *211+400=611* | *100(611/611)= 100.00* |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **ALL OTHER C&D WASTE CUMULATIVE PROJECT HISTORY, REFER TO ATTACHMENT B PART 2 OF 3** | | | | | | | |
| *2/1/2020* | *2/28/2020* | *26* | *26* | *4* | *4* | *26+4=30* | *100(26/30)= 86.67* |
| *3/1/2020* | *3/31/2020* | *24.5* | *26+24.5=50.5* | *4.5* | *4+4.5=8.5* | *50.5+8.5=59* | *100(50.5/59)= 85.59* |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Does this Report meet the minimum recycling requirement of 80% for Inert Debris and 65% for All Other C&D Waste? Contractor is to meet the minimum recycling requirements of 80% for Inert Debris and 65% for All Other C&D Waste by the end of construction.

YES ☒ NO ☐

| Name & title of person responsible for the information in this form: *Bobby Lee, Project Manager* | Signature: *Bobby Lee* |
|---|---|

***From appropriate Part I or II during each period.**
**Each Attachment B Part III Report needs to have the Tons Diverted and Tons Disposed from every previous Diversion and Disposal Report documented in it, as well as the totals from this Report.**
**Attach another Part III form and continue information if more rows are needed.**

# APPENDIX "F"

# ELECTRICAL SAFETY POLICY – IMPLEMENTATION PLAN

LOS ANGELES HARBOR DEPARTMENT

CONSTRUCTION DIVISION

ELECTRICAL SAFETY POLICY – IMPLEMENTATION PLAN

PROJECT: AVALON PEDESTRIAN BRIDGE AND PROMENADE GATEWAY SPECIFICATION NO: 2804A

INSPECTOR: _____ DATE: 12/22/2025

THE CONTRACTOR SHALL:

IMPLEMENT THE ELECTRICAL SAFETY POLICY IN ACCORDANCE WITH THE BOARD OF HARBOR COMMISSIONERS' RESOLUTION NO. 6315, ADOPTED OCTOBER 27, 2004.

**APPRENTICES AND JOURNEYMEN:**

| | |
|---|---|
| | All apprentices will be registered in a State of California Approved Apprenticeship Program. |
| | The use of "Journeymen" will comply with all State of California labor laws. |

**THE WORKFORCE OF PROJECTS DESIGNATED AS REQUIRING "ELECTRICAL SAFETY CRITERIA" SHALL COMPLY WITH THE FOLLOWING:**

| | |
|---|---|
| | 70% of all "Journeymen Wiremen" will be graduates of a State of California Approved Electrical Apprenticeship Program. |
| | 20% of the jobsite electrical workers will be OSHA 10-hour General Industry Safety and Health Certified. |
| | At least one jobsite electrical worker will be OSHA 30-hour General Industry Safety and Health Certified. |

| | |
|---|---|
| | The required workforce ratios will be determined by verifying the workforce composition on a daily basis. |

**FAILURE TO FULLY IMPLEMENT AND MONITOR THE ELECTRICAL SAFETY POLICY MAY RESULT IN AN ASSESSMENT OF PENALTIES AND/OR POSSIBLE SANCTIONS AGAINST THE CONTRACTOR.**

Distribution:

Contractor
Job File
Inspector

As the contractor's representative, I understand and agree to comply with the above Electrical Safety Policy.

J. Bailey 12/22/2025

Signature Date

# APPENDIX "G"

# LOS ANGELES HARBOR DEPARTMENT
# IMPORT MATERIAL CHECKLIST

# LOS ANGELES HARBOR DEPARTMENT
# IMPORT MATERIAL CHECKLIST

## GENERAL INFORMATION

**Project Name**: _____ **Contract Spec No.**: _____

Project Address: _____

Source of Import Material
Source Type: _____ Unique Identifier (if any): _____

Name/Address of Supplier/Source: _____
Origin of Import Material: Quarry:____ Industrial/Commercial: _____ Other: _____

## SAMPLING INFORMATION

**Sampling Firm Name**: _____

Address: _____

Sampler's Name(s): _____
Sample Type: Grab: ____Composite: ____

**Analytical Laboratory Name**: _____

Address: _____
Laboratory Report Number: _____
(Include: sampling locations map, number of samples analyzed, etc.):

_____

_____

_____

## CERTIFICATION

I certify that all information, sampling, and analytical laboratory data and results provided regarding the subject material are accurate, correct, and complete to the best of my knowledge and belief.

_____ Date: _____
Contractor Signature – Licensed Professional

_____ Title: _____
Print Name – Licensed Professional

Note: Attach copies of completed all pertinent information, including sampling and laboratory data for checklist verification.

## POLA ACCEPTANCE

_____Approved _____Reject (Explain): _____

_____ Date: _____
POLA Authorization Signature

_____
Print Name

# APPENDIX "H"

# BRIDGE AND SUNDIAL SPECIAL PROVISIONS

# Avalon Pedestrian Bridge

## Bridge and Sundial Special Provisions

**May 22, 2025**

**Revision No. 0**

**Prepared For:**

THE PORT OF LOS ANGELES
ENGINEERING DIVISION
425 S. PALOS VERDES STREET SAN PEDRO CA 90731-3309

**Prepared By:**

TYLin

# Special Provisions

All work related to pedestrian bridge and concrete sundial must conform to the State of California Department of Transportation (Caltrans) Standard Specifications (2022 Edition) and all revisions at the time of bidding and these special provisions.

# STANDARD PLANS LIST

The standard plan sheets applicable to this Contract include those listed below. The applicable revised standard plans (RSPs) listed below are included in the project plans.

| | |
|---|---|
| | **ABBREVIATIONS, LINES, SYMBOLS, AND LEGEND** |
| **A3A** | **Abbreviations (Sheet 1 of 3)** |
| **A3B** | **Abbreviations (Sheet 2 of 3)** |
| **A3C** | **Abbreviations (Sheet 3 of 3)** |
| **A10A** | **Legend - Lines and Symbols (Sheet 1 of 5)** |
| **A10B** | **Legend - Lines and Symbols (Sheet 2 of 5)** |
| **A10C** | **Legend - Lines and Symbols (Sheet 3 of 5)** |
| **A10D** | **Legend - Lines and Symbols (Sheet 4 of 5)** |
| **A10E** | **Legend - Lines and Symbols (Sheet 5 of 5)** |
| **RSP A10F** | **Legend - Soil (Sheet 1 of 2)** |
| **RSP A10G** | **Legend - Soil (Sheet 2 of 2)** |
| **A62B** | **Limits of Payment for Excavation and Backfill - Bridge Surcharge and Wall** |
| **A62C** | **Limits of Payment for Excavation and Backfill - Bridge** |
| | **TEMPORARY CRASH CUSHIONS, RAILING AND TRAFFIC SCREEN** |
| **RSP T1A** | **Temporary Crash Cushion, Sand Filled (Unidirectional)** |
| **RSP T1A1** | **Temporary Crash Cushion, Sand Filled (Unidirectional)** |
| **RSP T1B** | **Temporary Crash Cushion, Sand Filled (Bidirectional)** |
| **RSP T2** | **Temporary Crash Cushion, Sand Filled (Shoulder Installations)** |
| **T3A** | **Temporary Railing (Type K)** |
| **T3B** | **Temporary Railing (Type K)** |
| | **BRIDGE DETAILS** |
| **B0-1** | **Bridge Details** |
| **B0-3** | **Bridge Details** |
| **B0-5** | **Bridge Details** |
| **B0-13** | **Bridge Details** |
| | **RETAINING WALLS** |
| **B3-5** | **Retaining Wall Details No. 1** |
| **B3-6** | **Retaining Wall Details No. 2** |
| | **T-BEAM DETAILS** |
| **B6-10** | **Utility Openings - T-Beam** |
| | **BOX GIRDER DETAILS** |
| **B7-1** | **Box Girder Details** |
| | **CAST-IN-PLACE POST-TENSIONED GIRDER** |
| **B8-5** | **Cast-In-Place Post-Tensioned Girder Details** |
| | **CONCRETE BARRIERS** |
| **B14-5** | **Water Supply Line (Details) (Pipe Sizes Less Than 4")** |
| | **ROADSIDE SIGNS** |
| **RS1** | **Roadside Signs - Typical Installation Details No. 1** |
| **RS2** | **Roadside Signs - Wood Post - Typical Installation Details No. 2** |
| **RS4** | **Roadside Signs - Typical Installation Details No. 4** |

# ORGANIZATION

Special provisions are under headings that correspond with the main-section headings of the *Standard Specifications*. A main-section heading is a heading shown in the table of contents of the *Standard Specifications*.

Each special provision begins with a revision clause that describes or introduces a revision to the *Standard Specifications*.

Any paragraph added or deleted by a revision clause does not change the paragraph numbering of the *Standard Specifications* for any other reference to a paragraph of the *Standard Specifications*.

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

# DIVISION I GENERAL PROVISIONS

## 5 CONTROL OF WORK

**Replace section 5-1.14 with:**

### 5-1.14 SAFETY QUALITY CONTROL MANAGER

#### 5-1.14A General

Allocate a full-time, on-site safety quality control manager (SQCM) to project safety, for the duration of this Contract. The SQCM must be available after hours as needed. The SQCM is not required to be on-site during a plant establishment period or when no work is being performed during project temporary suspensions.

Develop a written site-specific safety program (SSSP) that incorporates known hazards associated with the project.

#### 5-1.14A(1) Submittals

Submit a resume of the SQCM before starting work on the project, including education, heavy construction safety experience, and completed safety training.

Submit a copy of the SQCM's certificates for Cal/OSHA 30-hour construction training course and traffic control supervisor training as an informational submittal. The certificate must include:

1. Names of Department authorized entity providing certification
2. Name of the individual receiving certification
3. Date when the certification was provided
4. Expiration date

Submit a copy of the SSSP as informational submittals:

1. At least 15 days before starting work
2. At least 48 hours before starting work whenever a revision is made to the SSSP

Submit daily safety status reports within two business days of report date, including completed construction site safety inspection checklists as informational submittals.

#### 5-1.14A(2) Quality Assurance

#### 5-1.14A(2)(a) General

Not Used

#### 5-1.14A(2)(b) Certifications

The SQCM must have completed training and received a certificate of completion for:

1. Cal/OSHA 30-hour construction training course

2. Traffic control supervisor certification. Department authorized traffic control supervisor training providers list is available at:

   https://dot.ca.gov/programs/construction/safety-traffic/safety-training-courses

The SQCM must have one of the following certifications from the Board of Certified Safety Professionals:

1. Certified Safety Professional
2. Construction Health and Safety Technician
3. Occupational Hygiene and Safety Technician

**5-1.14A(2)(c) Qualifications**

The SQCM must be a competent and qualified person, as defined by Cal/OSHA, and must provide safety oversight on the project. The SQCM must have:

1. Four-year college degree
2. At least 5 years of experience in heavy construction safety
3. Knowledge in the area of safety procedure for all types of work being performed on this project
4. Knowledge of Caltrans specifications and plans, Cal/OSHA policy and procedures, and California Code of Regulations Title 8 safety requirements

The SQCM must have completed safety training and maintain valid certifications for:

1. First aid
2. Cardiopulmonary resuscitation (CPR)
3. Confined space
4. Fall protection

**5-1.14B Materials**

Not Used

**5-1.14C Construction**

The SQCM must be available by:

1. Cellular telephone
2. Two-way radio
3. Mobile internet access

The SQCM must:

1. Develop the SSSP
2. Confirm each worker’s compliance with the Cal/OSHA drug testing requirements
3. Conduct the on-site new project orientation for each worker assigned to the project
4. Review the construction work plans for each subcontractor before starting work
5. Conduct or attend pre-planning sessions for high hazard work such as excavations, demolition, confined space entry, falsework, crane hoisting, high-risk utilities such as, high pressure pipelines with fuel or natural gas, and tunneling or boring
6. Conduct weekly job site safety meetings
7. Review work schedules including subcontractors', to ensure adequacy of job hazard analyses and address all safety concerns and issues
8. Ensure SDSs are available on-site for all materials and have a hazard communication program for informing workers of material hazards
9. Verify compliance with hazardous waste requirements under section 14-11, including spill prevention and control measures
10. Conduct daily safety inspection of the job site for hazards and compliance with safety requirements in the specifications and 8 CA Code of Regs
11. Document safety inspections at every location where construction activity is active using a construction site safety inspection checklist that includes at a minimum:
    11.1. Date
    11.2. Name of inspector

11.3. Inspection location
11.4. Construction activity
11.5. Name of foreperson
11.6. Safety topics that include:
    11.6.1. General
    11.6.2. Housekeeping and sanitation
    11.6.3. Fire prevention
    11.6.4. Personal protective equipment
    11.6.5. Electrical safety
    11.6.6. Hand and power tools
    11.6.7. Falsework safety
    11.6.8. Scaffolding safety
    11.6.9. Ladder safety
    11.6.10. Excavations and trenches
    11.6.11. Heavy equipment
    11.6.12. Cranes
    11.6.13. Concrete construction
    11.6.14. Steel erection
    11.6.15. Welding and cutting
    11.6.16. HMA or concrete paving
    11.6.17. Tunneling
    11.6.18. Confined space
    11.6.19. Fall protection
    11.6.20. Methane
12. Ensure that the lane closure traffic control daily report is completed by the traffic control technicians and traffic control daily review report is completed by the traffic control supervisor when a traffic control supervisor is required
13. Review the lane closure traffic control daily reports and traffic control daily review reports for any work zone related safety issues
14. Revise SSSP to include procedures to mitigate hazardous situations identified in construction site safety inspections, lane closure traffic control daily reports, and traffic control daily review reports
15. Investigate any near misses or reported incidents in a timely manner and take appropriate action to prevent similar incidents in the future
16. Report all incidents to the Engineer immediately, including the investigation of any close calls
17. Prepare a daily safety status report that includes:
    17.1. Daily construction work activities, including temporary traffic control
    17.2. Safety related field activities
    17.3. Identified safety deficiencies and corrective actions taken
    17.4. Meetings, conversations, and other communications related to safety issues
    17.5. Any reported near misses or incidents
18. Submit daily safety status reports to the Contractor's on-site superintendent for submittal to the Engineer

When monitoring work zone, take immediate corrective action and notify the Engineer if an imminent danger is identified.

If the Engineer determines the SQCM is not meeting the intended duties and responsibilities, you must replace the SQCM within 30 days of written notice from the Engineer. If you need to replace the SQCM, notify the Engineer and provide replacement SQCM resume and required certifications at least 15 days before the replacement.

**5-1.14D Payment**

Not Used

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

# 6 CONTROL OF MATERIALS

**Add to paragraph 1 of section 6-2.02C:**

QC Manager must have at least 10 years of bridge construction quality control experience which includes a minimum of 1 cable supported bridge. Submit QC Manager qualifications to POLA for review and approval.

^^^

**Add section 19-3.03B(6) Dewatering:**

The Department will not obtain a NPDES (National Pollutant Discharge Elimination System) Permit for dewatering. If the Contractor chooses to dewater, Contractor shall be responsible for obtaining the NPDES Permit, paying for fees, complying with the requirements, and ensuring there is no impact to the schedule.

Submit to the Engineer for approval, a schedule for dewatering operations and a list of proposed methods and equipment.

The approximate groundwater elevation is available in the Geotechnical Design Report and the report has been included in the bid package. Due to the close proximity to the ocean, the groundwater at the Project site is influenced by tidal fluctuations. The groundwater is known to be impacted with contaminants and has been identified in the Soil Management Plan which is included in the bid package. Contractor shall expect to dewater the rate of groundwater flow estimated based on the following soil permeability parameters and assume water is contaminated and hazardous.

| Approximate Elevation (ft, MLLW) | Soil Type | Coefficient of Permeability (ft/min) |
|---|---|---|
| Ground Surface to minus 2 | Loose to Medium Dense Silty Sand (SM) | 10^-3 |
| Minus 2 to minus 20 | Soft to Hard Lean Clay, Fat Clay, Silt and Elastic Silt (CL,CHJ, ML, MH) with interbedded layers of Silty Sand | 10^-6 |

Provide an adequate dewatering system for the control of surface, ground, and sea water in the trench excavations and elsewhere in the Project as may be necessary during the construction period. Keep excavation dry during construction operations. Keep water table 1 foot below the bottom of the excavation until backfill has been completed.

Water extracted by the dewatering shall be disposed of by Contractor off Department Property in such a manner as will not damage public or private property or create a nuisance or health menace.

De-silt the water before discharging it.

The Los Angeles Region of the California Regional Water Quality Control Board (CRWQCB) classifies water used in construction as construction wastewater, the disposal of which is subject to their regulations. Reference shall be made to requirements for discharge and monitoring of wastewater as issued by the CRWQCB, Los Angeles Region.

Except for shutdowns for maintenance of dewatering equipment, no interruptions in the dewatering system procedures shall be permitted during excavation and construction operations. Provide full-time surveillance and maintenance, 24 hours per day, to avoid breakdowns. Where at all possible, Contractor shall avoid removing groundwater from excavations.

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

# DIVISION VI STRUCTURES

## 48 TEMPORARY STRUCTURES

**Add to section 48-2.01C(1):**

Do not begin falsework construction until related submittals are approved by the Engineer.

**Revise paragraph 2 of section 48-2.01C(2):**

Shop drawings and calculations must be signed by an engineer who is registered as a civil engineer in the State for bridge falsework.

**Add to paragraph 4 of section 48-2.01C(2):**

15. Method of vibration for each portion
16. Shot drawings and calculations for falsework removal systems employing methods of holding falsework from above winches, hydraulic jacks with prestressing steel, HS steel rods, or cranes:
17. Cal/OSHA compliant construction and inspection access for arch
18. Arch placing diagram showing concrete placing sequence and construction joint locations. If a schedule for placing concrete is shown, no deviation is allowed.

**Add to section 48-2.01C(2):**

Do not begin falsework removal without approval by the Engineer. The Construction Manual Engineer must be on site during all falsework release and removal activities.

Submit shop drawings with supporting calculations for arch construction engineering.

Arch construction engineering must be prepared and signed by an engineer who is registered as a civil engineer in the State.

Detailed procedures for installing cable anchorages, cable assemblies, stressing cables and maintaining geometric control of the bridge must be developed and submitted to the Engineer for approval. Complete shop drawings with supporting calculations must be submitted showing all equipment and procedures required for stay cable force adjustments and for complete dimensioning. No approval will be given to any portion of the stay cable anchor assembly or procedures until all required submittals are made and accepted by the Engineer.

The Contractor shall submit drawings illustrating fully their proposed method of stay cable erection and installation. Drawings shall show details of all lifting and handling devices and attachments to the stay cables: the sequence of erection, location and capacities of lifting equipment as well as location of lifting points on the stay cables, and weights of the stay cables.

Arch construction engineering must be complete in detail for all phases and conditions during the stay cable installation. The results of all design computations and computer analyses prepared by the Contractor to determine erection stresses, reactions, geometry, and cable adjustments, at each stage of erection, must be submitted to the Engineer for review as part of the arch construction engineering.

Calculations must be submitted to the Engineer shown the service stresses in all load bearing components of anchorage assemblies. Values shown on the stay cable data sheets are based on design loads and geometry and do not anticipate temporary configurations during erection.

Before erection, the Contractor shall furnish to the Engineer dead load computations based on weights and geometry from approved shop drawings to verify final dead load assumptions and cable forces/lengths.

Based on the Contractor’s falsework, construction equipment, and procedures, the Contractor must compute and prepare a table of anticipated cable tensions in each cable at corresponding stages of erection and after full dead load, including wearing surfaces, planters, and railings. The table of anticipated cable tensions and computations must be submitted to the Engineer for review.

Details, including cable lengths, must be developed by the Contractor to provide proper final dead load geometry and cable tensions. The Contractor’s details must show the proposed cable assembly fabrication lengths and final lengths of cables, including initial and final geometry of the arch and deck, to ensure there is adequate capacity to adjust each stay cable.

Arch construction engineering must include a cable installation procedure which describes cable force and elongation for the installation of each stay cable. Deck and arch elevations for each jacking operation

must be included and be utilized to establish the priority of force or elongation for control of the jacking operation. This procedure must stipulate the permissible variance between force and elongation and deck/arch elevation for each cable installed.

Changes to the construction and erection sequence or procedure from those used in the development of the cable installation procedure must be incorporated in revisions to the cable installation procedure.

Jacks and gauges for stay cable installation must be calibrated within one month prior to the beginning of the cable installation, and every six months thereafter, for the duration of the cable installation. Calibration records must be submitted to the Engineer prior to jacking.

Permanent records must be established for each cable installation and be provided to the Engineer in electronic format and hard copy. The records must include survey records including: date, time and ambient temperatures; cable forces; cable elongation measurements; socket adjustments; deck loading conditions, and other special notations necessary and sufficient to establish the conditions under which the cable was installed.

The review time for shop drawings for specific structures or portions of structures is shown in the following table:

| Structure or portion of structure | Total review time |
|---|---|
| Avalon Pedestrian Bridge | 65 days |

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

## 49 PILING

**Replace Section 49 “Piling” with:**

Specification section 31 6213.23 “Prestressed Concrete Piles” and section 31 6214 “Concrete Indicator Pile Testing”.

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

## 50 PRESTRESSING CONCRETE

**Replace the 2nd paragraph of section 50-1.01C(3) with:**

For initial review, submit:

1. 10 copies

**Add to the table in the 1st paragraph of section 50-1.01C(5):**

| | | |
|---|---|---|
| Prepackaged Grout | 1 | 1-60 pound bag with manufacture date within 6 months of placement |

**Add to the 1st paragraph of section 50-1.02D:**

Ducts for threaded prestressing bar at cable anchorages must be PVC plastic.

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

# 51 CONCRETE STRUCTURES

**Add to section 51-1.01A:**

The portions of the bridges shown in the following table must be constructed of mass concrete under section 51-6:

| Bridge name and number | Portion of bridge |
|---|---|
| Avalon Pedestrian Bridge | Arch Strut and Base |
| Avalon Pedestrian Bridge | Arch Pile Caps |
| Avalon Sundial | Any Pour With Least Dimension Exceeding 7' – 0" |
| | |
| | |

**Add to the list in the 6th paragraph of section 51-1.01A:**

**Replace section 51-1.01D(2)(b)(iii) with:**

**51-1.01D(2)(b)(iii) Mock-ups**

Construct a mock-up for arch rib.

For arch rib the mock-up must be minimum 15 feet long and a minimum height of 5 feet from the ground. The mock-up must include a minimum of two fin plates, location to be determined by the Engineer.

Construct the mock-up using the personnel, materials, tools, equipment, and methods to be used in the arch rib work.

The mock-up forms must be similar to the forms used for the production element. Include in the mock-up the arch void, reinforcement, and concrete embedments shown.

The mock-up must demonstrate:

1. Vibration and concrete pour methods encapsulates the reinforcement and embedments and complies with section 51-1.03D
2. You are capable of constructing a bridge element within the anticipated time periods, including delivery, placement, finishing, curing times, and in similar atmospheric conditions expected during construction
3. Falsework provides access required for construction and inspection
4. Construction joint finishing

Place concrete in the mock-up in the Engineer's presence.

When directed by the Engineer, the mock-up must be cut longitudinally and transversely to allow inspection of the interior walls.

If the Engineer rejects the mock-up, construct additional mock-ups until the mock-up is authorized. The mock-up must be authorized before starting arch work.

Dispose of the mock-up.

**Add to section 51-1.02B:**

**Revise the 3rd paragraph of section 51-1.02B:**

Concrete as indicated in the Concrete Strength and Type Limits shown on the plans must contain:

**Replace section 51-1.03A with:**

**51-1.03A General**

Submit Integrated Shop Drawing (ISD) and Construction Manual for approval.

**51-1.03A(1) Integrated Shop Drawing**

ISD is three-dimensional and complies with the details shown on the plans. An ISD is required for the sundial and bridge excluding abutments. The bridge ISD must extend from the bottom of pile cap to top of arch. ISDs must be approved prior to submittal of falsework shop drawings.

Utilize commercially available software that checks for interference in three dimensions. Prior beginning ISD development, submit to the Engineer the product name and application features of the software for review and approval to ensure software complies with this specification. Conflict identification software shall be compatible with the computer-aided drafting (CAD) software used to develop the ISD. Fastener components must be shown to correct length and with clearance envelopes for fastener tools. NAVD 88 datum shall be used to geodetically orient each ISD. Develop CAD files using different layers for each item such that the sequence of construction of the member or area being detailed can be shown.

The ISD is used to demonstrate understanding of the geometry shown on the plans and to identify all conflicts or interference between the planned positions of embedded items while satisfying the concrete cover shown on the plans.

If a conflict is identified, document the conflict and notify the Engineer. The Engineer will review the conflict and provide a resolution. Changes may be proposed to resolve the conflict. Proposed changes to embedded items must be made by an engineer who is registered as a civil engineer in the State.

Conflicts discovered by the ISD which are caused by the Contractor's proposed means and methods must be resolved by the Contractor and submitted to the Engineer for review and approval.

Proposed changes in the ISD shall be applied in the following sequence of item priority as necessary:

1. Non-structural embedded items
2. Bar reinforcing steel
3. Leveling bolts
4. Anchor studs
5. High strength anchor rods

The ISD must include the following:

1. Details corresponding to the final plans with locations of all conflicts indicated
2. Lists of conflicts with descriptions of each conflict
3. Updated ISD with proposed modifications incorporated. Indicate that all previous conflicts have been resolved and details shown on the plans are met
4. CAD file and PDFa for use by the Engineer

Allow 25 days for the Engineer's review. CAD files of the contract drawings will not be made available.

**51-1.03A(2) Construction Manual**

Construction Manual may contain erection sequences similar to the suggested sequence shown on the Contract Plans or alternative sequences. The manual must be signed by an engineer who is registered as a civil engineer in the State.

The Construction Manual must address the intended method of constructing:

1. Falsework installation and removal
2. Concrete placement
3. Cable erection
4. Temporary Support Structures

Submit a Draft Construction Manual and Final Construction Manual.

The Draft Construction Manual is intended to:

1. Illustrate the status of engineering efforts related to the bridge erection.

2. Present the format of the Construction Manual intended to fulfill the requirements identified in the Specifications.
3. Communicate the specific sequence of activities planned for bridge erection.

Submit the Final Construction Manual prior to the beginning of falsework, concrete placement, and cable erection. At the Contractor's option, the Final Construction Manual may be submitted in parts, addressing each of the items individually. Submit the Final Construction Manual in advance of the date scheduled for beginning the work for each item to afford the Engineer 15 working days review prior to commencement of work. The review of the Final Construction Manual by the Engineer does not relieve the Contractor of the full responsibility for the safety and adequacy of the work.

The Construction Manual must include, but not be limited to the following:

1. Detailed Design

Provide detailed design of all erection equipment, falsework bents, temporary bracing and items required for erection of the arch and temporary supporting structures, cables, and installation procedures including schedules for all temporary falsework, including any proposed limits of required excavation and subsequent recompaction of the temporary staging work areas. Prestressing sequence and procedures must be included.

2. Methods and Procedures
   a. Sequence and manner of construction
   b. Details and limits of any structure including temporary falsework
   c. Sequence of installing temporary falsework bents, removing temporary falsework bents and transferring loads to cables
   d. Details including provisions for stabilizing partially erected arch and temporary supporting structures during the various stages of construction
   e. Sequence and schedule for prestressing
   f. Sequence and schedule for falsework, movement of equipment, support jacking, stressing and stressing order of cables and erection elevations
   g. Details of the disposition and use of special erection equipment, falsework, and temporary supports, including all loads or reactions from equipment applied to the structure during erection and sequences and timings of these effects in accordance with the erection schedule
   h. Procedures and details of equipment used to verify loads in cables
   i. Sequence and manner of installing tuned mass damper system (if required)

3. Computations
   a. The expected maximum bearing, shear, compression and tensile stresses in the falsework and piers as may be produced with the Contractor's proposed sequences and methods of erection.
   b. Minimum and maximum vertical reactions at all temporary support locations
   c. Design of any temporary foundations required to support falsework bents
   d. Design of all falsework bents and temporary bracing and subsequent temporary connections to the permanent structure
   e. Verification that the permanent structure is not overstressed during erection and other construction activities
   f. The expected maximum shear, compression and tensile stresses and deflections in the superstructure and arch as may be produced with the Contractor's proposed sequences and methods of erection
   g. Methods and procedures for tracking, verifying and correcting arch and superstructure geometry at each construction stage

**Add to the end of section 51-7.01D with:**

Skate stops for benches are included in the payment for Minor Concrete (Bench).

**Add to the end of section 51-1.03F(3), paragraph 2:**

9. Bridge arch

10. Bridge arch base

11. All areas of the bridge visible to the public; excluding the underside of the bridge. Finish underside of bridge with ordinary finish.

**Add section 51-8:**

## 51-8 ARCHITECTURAL DECK TREATMENT

### 51-8.01 GENERAL

#### 51-8.01A Summary

Section 51-8 includes specifications for constructing architectural deck treatment shown on the plans. Use Craftsmen Specification Finishes for architectural deck treatment.

#### 51-8.01B Definitions

Not Used

#### 51-8.01C Submittals

Submit items A through H, excepting item B, in Section 32 13 15, 1.6 “Submittals” of these special provisions.

#### 51-8.01D Quality Assurance

#### 51-8.01D(1) General

Provide quality assurance as described under Section 32 13 15, 1.7 “Quality Assurance” of these special provisions.

### 51-8.02 MATERIALS

Provide materials for architectural deck treatment under Section 32 13 15, 2.1 “Materials”, items E, F, G of these special provisions.

### 51-8.03 CONSTRUCTION

Construct architectural deck treatment under Section 32 13 15, 3.3 “Craftsman Specification Installation” 3.5 “Curing”, 3.6 “Sealing”, 3.7 “Protection”. And 3.8 “Maintenance” of these special provisions.

### 51-8.04 Payment

The payment quantity for architectural deck treatment is the area measured from the plans.

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

# 55 STEEL STRUCTURES

**Add to section 55-1.02D(2):**

Steel for fracture critical members must:

1. Comply with CVN impact requirements for Zone 2, welding, and welding inspection in "AASHTO/AWS Fracture Control Plan (FCP) for Non-Redundant Members" of AWS D1.5.
2. Be produced by a fabricator certified under *AISC Certification Program for Steel Bridge Fabricators, Intermediate Bridges with Fracture-Critical Members*.

**Replace "Reserved" in section 55-4 with:**

## 55-4 STAY ~~CABLE~~ CABLES

### 55-4.01 GENERAL

#### 55-4.01A Summary

Section 55-4 includes specifications for fabricating, furnishing and installing stay ~~cable~~ cables for the Avalon Pedestrian Bridge. Components of stay ~~cable~~ cables include:

1. Zn95/Al5 Coated Carbon Steel Cables
2. Galvanized Fatigue Resistant Adjustable Open Spelter or Resin Socket

#### 55-4.01B Definitions

**spelter:** A metal alloy in which zinc is the main constituent.

**fully locked wires:** Strands that are made of shaped high-strength wires which helically spun around a core covered with interlocking, Z-shaped wires.

**killed steel:** steel that has been completely deoxidized by the addition of an agent before casting.

**Characteristic breaking strength:** the force the cable system, including all fittings and clamps, has to withstand before failure.

**$f_{CBL}$:** the stress in the cable system due to the minimum characteristic breaking load shown on the plans.

**Zn95/Al5:** 95% zinc and 5% aluminum coating for full locked cables.

#### 55-4.01C Submittals

##### 55-4.01C(1) Shop Drawings and Calculations

Submit complete cable system fabrication engineering documents and supporting calculations for furnishing and fabricating the stay cable system including the following:

1. Stay cable cables manufacturing procedures.
2. Written procedures for quality control and testing during cable manufacturing procedures.
3. Written procedures and drawings for stretching, measuring, and socketing the cables.

Submit complete stay cable system construction engineering documents and supporting calculations for erection of the cable systems including the following:

1. Erection drawings, written procedures, and calculations showing the temporary works required for the stay cable system construction, including strand storage, unreeling procedures and equipment.
2. Erection plan and corresponding stay cable forces, consistent with loads shown on the plans.
3. Erection drawings, calculations, and written procedures showing each sequence for each stage of construction of the stay cable system, release of falsework and transfer of the stay cable load. Include

calculations for creep, elongation, and temperature effects. Submit procedures for measuring the forces in the stay cables.
4. Erection drawings and written procedures showing installation of the cable anchor assembly for the stay cable cables, construction of the stay cable system and transfer of load through the adjustable spelter socket connection.

Shop drawings and calculations must be sealed and signed by an engineer who is registered as a civil engineer in the State.

Allow 30 days for review of the stay cable system shop drawings.

**55-4.01C(2) Production Test Report**

Gather and submit three (3) copies of all test data and Certificates of Compliance related to the manufacturing, fabrication and inspection of the cables, connections and assembly in a final report before any fabrication. The Certificates of Compliance must be from the most recent testing performed at an independent ISO 17025 accredited laboratory. Standard data and catalog cut sheets from the cable manufacturer will not be considered sufficient. Include the following in the final report:

1. Laboratories where tests were conducted.
2. Certificates of calibration.
3. Names of standard tests.
4. A brief description of what is being tested and all test data, including stress strain curves or load deformation curves, and test data from manufacturers.

Submit three (3) copies of certified mill test reports for each heat of steel used for wire manufacture and for cable connection steel. Mill test reports must include heat and product analysis reports. Mill test reports must be traceable to individual strands.

Submit certificates of compliance for wire and cable mechanical properties and inspection requirements in accordance to the standards referenced in this special provision. Submit Zn95/Al5 and galvanized coating properties in accordance to the referenced standards.

If the cable supplier is located outside of the United States, submit a current registration document certifying the supplier has established and applies a Quality Management System for Development, Manufacture, and Distribution of Wire Rope Systems, Building Systems, and Material Handling Systems, fulfilling the requirements of ISO 9001:2000.

Submit a 10-year manufacturer's warranty of structural components to be free from manufacturing defects from date of project completion.

**55-4.01C(3) QA Test Sample**

Prior to installation submit actual size test samples for the following components. The test samples must be authorized before the installation of the cables.

1. Three fully locked stay cable cables (10 feet minimum length) with cable end fitting with corrosion protection for characteristic breaking strength testing.
2. Two samples of each cable fitting/attachment/connector with corrosion protection as specified.

Fabricate and finish each assembly test sample and cable fitting using the same materials and methods to be used for the production cable assembly, in accordance with these special provisions and the details shown on the plans. The cable assembly samples must be tested in accordance with these special provisions and must be witnessed by the Engineer. Submit cable fitting/attachment/connector samples with the Production Test Report.

**55-4.01D Quality Control and Assurance**

**55-4.01D(1) General**

Not Used

**55-4.01D(2) Stay Cable System Quality Control**

The Contractor must designate in writing a Stay Cable Quality Control Manager (CQCM) under section 11-1.02. The CQCM must be responsible for the quality control of furnishing and fabricating the Stay Cables including the materials testing program.

The CQCM must review, guide, and monitor the shop inspection and shop quality control program, make shop visits at various stages of fabrication as required, and submit certificates of compliance for the materials and fabrication of the cable system.

The CQCM must prepare test procedures and programs for testing the cable stay cable assembly for compliance with these requirements. The CQCM must review the materials and assembly test results, obtain and review certificates of compliance from the suppliers of materials for the stay cable System, and submit the results.

The Engineer must have unrestricted access to all manufacturing fabrication and testing performed at the manufacturer's facilities or shipping and storage facilities. The manufacturer must afford the Engineer the necessary facilities to witness the tests for characteristic breaking strength and fatigue of the QA Test Samples. The manufacturer must also afford the Engineer the necessary facilities to witness the MT and UT tests for the stay cable fatigue resistant spelter sockets and pins.

**55-4.01D(3) Production Testing**

Submit a Certificate of Compliance with the following specifications for fabrication of the stay cables and their corresponding sockets and connections:

**Inspection and Testing during Fabrication of Wires and Cables**

| Component | ASTM Specification | EN Equivalent |
|---|---|---|
| Wires | ASTM A475, ASTM A586 | EN 10264-1, EN 10264-2, EN 10264-3, |
| Full Locked Zn95/Al5 Coated Cables | ASTM A603 | EN 12385-1, EN 12385-2, EN 12385-10 |

**Inspection and Testing during Fabrication of Sockets and Connections**

| Test/Inspection | ASTM Specification | EN Equivalent |
|---|---|---|
| Magnetic particle testing (MT) | ASTM E-709/ ASTM E-125/ASTM A788-S18 | EN 1369 |
| X-Ray Testing | ASTM E446, ASTM E280, or ASTM E186 (quality level 2) | EN 444 |
| Surface Crack (Visual) Testing | - | EN 1370 |
| Ultrasonic Testing (UT) | ASTM A788-S20 | EN 12680-1(severity level 2), EN ISO 9712 |

All castings must be designed and manufactured to develop 100% of the specified breaking strength of the connected cable without yielding. Castings must not in any way impair the load carrying capacity and efficiency of the cable. Strength of pins for the stay cable spelter sockets as a minimum must develop the Characteristic Breaking Load of the stay cable.

All castings must be magnetic particle tested (MT) at critical areas to EN 1369 quality level 2 or ASTM E-709/ASTM A788-S18 with acceptance levels per ASTM E-125 as follows:

**Acceptance level for castings**

| Type of Discontinuity | Acceptance Level |
|---|---|
| Linear Discontinuities | To be removed by grinding and blending |
| Shrinkage | 2 |
| Inclusions | 2 |
| Internal Chills-Chaplets | N/A |
| Porosity | 1 |

Each socket must be stamped “MT” (indicating Magnetic Particle Inspection) adjacent to a non-machined area. All sockets must be cast with the pattern number/part number, material grade, heat number and foundry symbol.

All castings must be ultrasonic tested (UT) to EN 12680-1 (Quality Level 2) or ASTM A788-S20, Level D and Level DA in two perpendicular directions.

**55-4.01D(4) Quality Assurance Testing**

After completing the assembly of the stay cable QA Test Samples, including the end fittings, notify at least 20 days before the testing.

The tests on the QA Test Samples must include the end fitting and the testing must be performed in a manner that replicates the loading that the cables will experience. The tests must be performed in the presence of the Engineer.

**55-4.01D(4)(a) Characteristic Breaking Strength**

Test the QA Test Samples for the characteristic breaking strength of the cable and connection. The stay cable must achieve the Characteristic Breaking Load specified in the Plans. Tensile testing must be in accordance with EN 10002-1 or ASTM 370. All cable sockets and connections must develop the Characteristic Breaking Load of the cable. The sampling and testing of the cable must comply with ASTM A603.

http://www.ruhr-uni-bochum.de/

**55-4.01D(4)(c) Damping**

The representative must observe cable vibrations. The duration of observation is 90 days and begins at the conclusion of stay cable stressing. If cable vibrations greater than 1 diameter in amplitude are observed, then the representative will require dynamic testing of the cable system and installation of cable damping.

Contractor must utilize a cable vibration expert to perform dynamic testing to determine cable damping as log decrement. Vibration expert shall have expertise in wind and pedestrian excitation of structures and have experience performing structural dynamics measurement and analysis of at least three bridges. Contractor shall submit vibration expert qualifications and method statement to the Engineer for review and approval which details the testing to be performed.

Submit to the Engineer a report summarizing the findings.

1. Test results data provided in tabulated and graphical format. Submit the test data in pdf and Microsoft Excel format
2. Transform all data using a Fast Fourier Transform (FFT) or equivalent method from the time domain to the frequency domain
3. Damping recommendations

The Contractor must provide dampers for cables as determined by cable testing. Submit shop drawings for proposed dampers and associated calculations to the Engineer for review and approval. Proposed damper system must have a minimum 50-year service life and include cable connections which prevent cable damage during installation and service life.

### 55-4.01D(5) Preconstruction Meeting

Schedule and hold a preconstruction meeting at least 5 business days after submitting the shop drawings and erection plan and at least 10 days before starting construction. You must provide a facility for the meeting. The Engineer, CQCM, fabricator, installer, and other subcontractors whose work interfaces with cable system must attend the meeting. The following items must be reviewed:

1. Method of attachment of components to supporting surfaces.
2. Detailed schedule of Works.
3. Installation, adjustment, cleaning, and protection of cable system.
4. Coordination with other Works.

## 55-4.02 MATERIALS

### 55-4.02A General

Purchase sufficient quantities of material considering the requirements for supplementary material testing, including material for testing described.

Individual wires for cable construction must be manufactured out of non-alloyed, killed steel molded quality steel. A minimum of two outer layers must be Z-profiled (full locked shaped) wire and must receive Zn95/Al5-coating (95% zinc and 5% aluminum) by a double-hot-dip process.

Inner layers must be helically spun round wires, cold drawn within the required tolerances. Diameter may not be smaller than 1/32-inch. The inner layers must be hot dip galvanized according to ASTM A586 Class A or EN 10244-2. Cavities in the cable's interior between heavy galvanized round wires and profile wires must be filled with an active inner filling such as PU-oil-based zinc dust paint or low-solvent, highly pigmented single-component zinc paste.

The materials must comply with the requirements shown in the following tables:

**Coatings**

| Component | ASTM Specification | EN Equivalent |
|---|---|---|
| Attachment of cables to sockets | ASTM B6-00 | EN 13411-4 |
| Zn95/Al5 (95% zinc and 5% aluminum) coating for Full Locked Cables | ASTM A856 | EN 10244-2, EN 10218-1 |
| Hot-dip-galvanized coating for Sockets and Connections | ASTM A153 | EN ISO 1461 |

**Steel Wires and Cables**

| Component | ASTM Specification | EN Equivalent |
|---|---|---|
| Outer layer - Z-wire | - | EN 10264-3 |
| Inner layers - helically spun round wires | ASTM A475, ASTM A586 | EN 10264-2 |
| Full Locked Zn95/Al5 Coated Cables | ASTM A603 | EN 12385-1, EN 12385-2, EN 12385-10 |

**Sockets and Connections**

| Component | ASTM Specification | EN Equivalent |
|---|---|---|
| Fatigue resistant open spelter/resin socket for stay cable | ASTM A148 Gr. 105-85 | EN 12844 / EN 13411-4 |
| Pins for socket | ASTM A675 Grade 80, AISI 5160 Steel, Ftu=129ksi min, Fy=111ksi | EN 10083 |

Submit Certificates of Compliance of all listed materials to the referenced standards. Alternative materials may be utilized upon approval by the Engineer.

Stay cable assemblies must be one of or equal to one of the assemblies shown in the table, "Cable Part Information," provided by the manufacturers listed in the following table:

**Stay Cable Manufacturers**

| Manufacturer | Address | Contact Information |
|---|---|---|
| Pfeifer Seil und Hebetechnik GmbH | 87700 Memmingen, Germany | Dr. .Karl Lenz Strasse<br>tel. +49-8331-937-367<br>fax. +49-8331-937-350<br>www.pfeifer.us.com |
| Radaelli Engineering | UK Office: 20 Horton View, Doncaster, South Yorkshire, DN3 1SD<br>Italy Office: Via A.Volta, 16, 20093 Cologno Monzese, Milano | David Ward, Regional Manager<br>+44 (0)1302 378327<br>Mobile +44 (0)7585 600810<br>Email: david.ward@redaelli.com |
| Bridon | Geschäftsführung: Thomas Licht<br>Registergericht:Gelsenkirchen 12 HR B 2184<br>USt-IDNr DE 811 883 171 Magdeburger Str. 14a Gelsenkirchen<br>D-45881<br>Germany | Friedhelm (Eric) Rentmeister<br>Technical Sales Manager \| BRIDON International GmbH<br>Tel +49 209 8001 168\| Fax +49 209 8001 278 \| Mob +49 171 8706 734 |
| WireCo Structures | 2400 West 75th Street<br>Prairie Village, KS 66208 | Timothy W. Klein, PE, P.Eng<br>Director of Global Engineered Fabrications<br>P: 816-270-4753 / C: 816-248-1833<br>Email - timklein@wirecoworldgroup.com |

**Cable Part Information**

| Manufacturer | Cable No. | Stay Cable Fitting No. |
|---|---|---|
| Pfeifer | PV Series-Full Locked Cable | Type 700 and 710 PV 150 Open Spelter Sockets |
| Radaelli Engineering | FLC Series-Full Locked Coil Strands | TTF and TBF Series Fork Socket |
| Bridon | LC Series-Locked Coil Strand | ST-F and ST-AF Series Fork Socket |
| WireCo Structures | WLC Series-Full locked coil strand | AR-FS and AD-FS Series Fork Sockets |

Use of equivalent assemblies must be authorized.

Exposed fasteners must be of same materials, color and finish as material to which applied.

**55-4.02B Fabrication**

**55-4.02B(1) General**

Fully locked coil cables and all components must be fabricated by a single manufacturer.

Mark finished stay cables for accurate field installation.

Field measurements: Take field measurements after permanent end terminations are in place and prior to preparation of shop drawings and fabrication, to ensure fitting of work.

**55-4.02B(2) Cable Assemblies**

Calculate final length of stay cable assemblies allowing for tensioning with all fittings, connectors and clamps/swages. The length with a threaded end fitting must be measured to the end of that fitting.

Length of entire stay cable system includes the fittings and adjustable socket, measured from center of pin to center of pin, or center of eye to center of eye. must be 1/2 open (i.e. 1/2 of thread length engaged) during installation.

All cables must be marked by a marking line, from one end to the other, to ensure that the cable is not twisted. All cables must have markings for the clamp positions.

The following values must to be calculated and documented when the cable fabrication length calculation is performed:

1. Creep of cable: The creep is the permanent elongation of the cable under load. The creep will only take place after installation. If creep values of the cables are not known, the creep values must be determined by 2 month creeping test.
2. Pre-stretching: To determine the exact elongation under load, pre-stretching must be performed on all cables. The value and number of cycles must be determined by the manufacturer to achieve the required results. The minimum number of cycles allowed is 5. The minimum pre-stretching force allowed is 35% to 45% of the characteristic breaking load, depending on the size/diameter of cable.
3. Elongation under loads: The elongation of the cable system under the loads shown on the plans must be calculated and considered.
4. Temperature: Fabrication temperature of the cable system will be different from the basis temperature in the calculation; the difference has to be considered
5. Elongation and twisting due to clamp pressure: The local elongation due to pressing from clamps must be taken into consideration to avoid corkscrew effects and additional elongation due to the clamps.
7. Tolerances. Maximum length tolerance of the cable system must be within +/- 3/8" under loads specified on the plans.

Castings must be exempt from inadmissible core or surface defects. Casting texture must conform to the requirements of EN 1370 roughness quality level 2 (SCRATA A2 or BNIF-2S1). Unless otherwise

specified, discontinuities may be either removed by grinding or welding. Castings must not be repaired unless a procedure equivalent to ASTM A148 with supplementary requirements S1 and S2 is provided.

Prior to galvanizing, the castings must be steel grit blasted to achieve a uniform surface finish. After blasting, fittings must be hot dip galvanized in accordance with EN 1461 or ASTM A153 Class A coating.

All castings must be heat treated, either full annealing, normalizing, normalizing and tempering, or quenching and tempering. Unless specified otherwise, the castings may be heat treated by any of these heat treatments at the option of the manufacturer.

All sockets for the stay cables must have line bored pin holes. Pin hole tolerances must be +.020” to -.000” with a 125 ANSI finish.

Material used for infill of speltered sockets for the stay cable must be of equal or higher grade as designated “high quality” zinc under ASTM B6.

Threaded rods must conform to EN ISO 683 and delivered bare (with temporary corrosion protection only). Bare threads must be cleaned thoroughly and greased prior to installation. After installation and cable adjustment are complete, bare threads must be degreased, cleaned, and apply 2 layers of approved organic zinc rich primers under section 75-1.05.

All fittings must comply with the tolerances specified in ISO 8062-3, ISO 965-1 and EN 22768-2 or following tolerances: dimensions under 4”: ±1/16”, dimensions over 4” ±1/8”, and pin diameter: +0” to -1/32”. A complete dimensional inspection must be undertaken on the first and all machined areas of each casting lot. All machined, forged or roller components must be subject to a dimensional inspection.

Clean fittings under ASTM A380. Any damage to the zinc or Zn95/Al5 coating must be cleaned and painted under section 75-1.05.

**55-4.02C Delivery, Storage, and Handling**

Transport, deliver and store components to prevent damage. Cable tension members may be supplied to the site on rings or coilers. An appropriate revolving table must be used for unwinding the rings and an appropriate winding frame for unwinding the coilers. The revolving tables or drums must be fitted with a braking device.

Identify the heat of steel (or each heat if more than one) used for the rod stock used for manufacturing the cable wire with a reference number indicating the name of the supplier and date of production. Attach a copy of the fill report for that heat number to the cable wire.

The following must be observed when unwinding the stay cables:

1. Do not twist members.
2. Do not pull over sharp edges.
3. Support members and do not buckle. Bending radius must not be less than R = 15 x rope diameter.
4. Do not damage corrosion protection.

Protect components during handling and installation to prevent damage. Only remove protective materials on rope end fittings immediately prior to installation. Provide suitable enclosures to protect the cables.

Transfer and attach the serial number from the coil to any wire specimen cut from it for testing.

Stay cables must be checked thoroughly for any transport damage before installation. Repair damaged galvanized surfaces under section 75-1.05.

**55-4.03 CONSTRUCTION**

Install the stay cable assembly in the sequence and to the loading shown. Any deviation from the plans must be authorized. Refer to manufacturer recommendations for cable installation.

Protect the stay cables from abrasion and sharp bending during all stages of erection.

### 55-4.03A Preparation

Coordinate templates, instructions and directions for installation of stay cable anchorages, such as threaded prestressing bars which are to be embedded in concrete construction. Install erection rigging system in accordance with manufacturer's product data and shop drawings. Any thread on cable connections must be cleaned thoroughly prior to installation. Damaged or dirty threads must not be assembled because this could lead to the tension member being unfit for use.

### 55-4.03B Installation

Installation must be carried out in compliance with the installation plan authorized based on the Shop Drawings. Assignment to the correct installation position must be ensured by marking all cable tension members. Cable tension members must not be installed twisted. A surface line must be marked on each cable tension members as a method of control. This line must not be twisted upon completion of elements.

Cable tension members must be pulled into installation position using a suitable hoisting device (e.g. winch) or using a suitable lifting device (e.g. suspension bar, spreading bar). Particular attention must be paid while doing so that there is no damage to the cables. In particular, pay attention that the cables are not buckled while lifting into place with suspension or spreading bars.

Appropriate devices (hydraulic cylinders) must be used for the application of pre-tension force. Rope operating equipment must be kept under supervision and checked at regular intervals. Use all means necessary to protect structural steel before, during, and after installation and to protect the installed work and materials of all other trades.

If dampers are required, notify the Engineer 2 weeks prior to installation of dampers.

Installation must be carried out in compliance with damper manufacturer’s recommendations and approved Shop Drawings. Cables must not be twisted due to damper installation. Cables damaged by the Contractor during damper installation will be replaced at the Contractor’s expense.

### 55-4.04 PAYMENT

Not Used

**Replace “Reserved” in section 55-5 with:**

## 55-5 Lighting Valance

### 55-5.01 GENERAL

### 55-5.01A Summary

Section 55-5 includes specifications for fabricating, furnishing and installing lighting valance for the Avalon Pedestrian Bridge. The lighting valance is comprised of stainless steel, stainless steel fasteners, epoxy grout, and concrete inserts.

### 55-5.01B Submittals

### 55-5.01B(1) General

Submit a certificate of compliance for materials used in the work.

### 55-5.01B(2) Shop Drawings

Submit shop drawings for lighting valance. Shop drawings must include:

1. Fabrication drawings
2. Installation drawings
3. Bolting templates and schedules
4. All stainless steel mounting and connecting hardware

## 55-5.02 MATERIALS

### 55-5.02A Delivery, Storage and Handling

Deliver lighting valance components in protective packaging for freight and handling purposes. Handle components to prevent damage, breaking, denting or scoring. Store in a clean and dry place. Protect from dirt, fumes, construction debris and damage.

### 55-5.02B Materials

Welding must comply with AWS D1.6.

Mounting and connecting hardware, attachments, and fastening components must be stainless steel and comply with section 55-1.

Concrete anchors must comply with section 75-3.02C. Anchors must be stainless steel unless they are not in contact with other stainless steel elements.

### 55-5.02C Quality Assurance

#### 55-5.02C(1) General

Templates for anchorage must be available for inspection.

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

## 78 INCIDENTAL CONSTRUCTION

**Replace the 1st paragraph of section 78-4.03B with:**

Coating for concrete must be PSX 805 by PPG or approved equal. Primer must be Amerlock 2 by PPG or approved equal. Apply products according to manufacturer recommendations.

**Replace the 2nd paragraph of section 78-4.03B with:**

The painted concrete must match color no. 27875 of AMS-STD-595.

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

# DIVISION IX TRAFFIC CONTROL DEVICES

## 83 RAILINGS AND BARRIERS

**Replace *Reserved* in section 83-5:**

**83-5 DECORATIVE COVER**

**83-5.01 General**

**83-5.01A Summary**

Section 83-5 includes specifications for fabricating and installing decorative covers for cable anchorages. Decorative cover consists of wood boards cut from black locust dimensional lumber, horizontal galvanized steel angle, galvanized steel backing plate, and galvanized steel hardware.

Miscellaneous steel, galvanized steel, hardware, and welding must comply with section 75.

Hot-dip galvanize miscellaneous steel under section 75-1.02B.

Anchorage to concrete must comply with section 75-3.02C.

**83-5.01B Abbreviations**

NHLA: National Hardwood Lumber Association

**83-5.01C Submittals**

Submit a certificate of compliance for timber and lumber stating the species of the material to be shipped and including a certified grading report. Submit complete shop drawings for each decorative cover assembly. The shop drawings must include the following:

1. Decorative cover layout

2. Material specifications and complete details of the decorative cover, installation hardware, and anchorage components

3. Details on the fabrication and installation of each decorative cover

4. Type and location of all fasteners

For initial review, submit 5 sets of drawings. Allow 15 days for review.

Prior to fabrication of the production decorative covers, fabricate a mock-up of at least two decorative covers, delivered to the site to evaluate the quality, fit and finish of the covers. Each mock-up must be fabricated and finished using the same materials and methods to be used for the production covers.

Mock-up shall demonstrate each unique detail related to the decorative cover including hole for cable, cable hardware terminations, and backing plates.

If ordered, additional handrailing mock-ups must be furnished until the specified quality, fit, and finish are obtained.

The decorative cover mock-up authorized must be used as the standard of comparison in determining the acceptability of the production railing.

All materials used in the decorative cover mock-ups must become the property of the Contractor and must be removed and disposed of by the contractor.

**83-5.01D Quality Assurance**

Timber and lumber must comply with the grading specifications when delivered to the job site.

**83-5.02 Materials**

**83-5.02A General**

Deliver, store, and handle wood lumber as follows:

1. Store in piles at the job site unless it is to be placed in the structure immediately
2. Stack neatly on dunnage minimum 24” above ground so that it can be readily inspected and with minimum 4” spacers between each bundle
3. Store materials under cover of breathable barrier and protected from sun to prevent warping, weather, and contact with damp or wet surfaces
4. Store and handle such that injury and breakage are avoided

**83-5.02B Black Locust Wood**

Black Locust wood lumber must:

1. Scientific name of Black Locust is Robinia pseudoacacia.
2. Wood lumber grade must be NHLA FAS.
3. Comply with the requirements shown in the following table:

| Quality characteristic | Requirement |
|---|---|
| Drying Method and Moisture Content (percent) | 6-8 |
| Density (lbs/cu ft) | 43 |
| Specific Gravity | 0.69 |
| Static Bending: | |
| Modulus of Rupture (psi) | 19,400 |
| Modulus of Elasticity (psi) | 2,050,000 |
| Work to Maximum Load (Ability to Absorb Shock) (in-lb/cu in) | 18.4 |
| Impact Bending: | |
| Height of 50 lb hammer drop to cause complete failure (in) | 57 |
| Compression Parallel to Grain: | |
| Maximum Crushing Strength (psi) | 10,800 |
| Compression Perpendicular to Grain: | |
| Fiber Stress at Proportional Limit (psi) | 1,830 |
| Shear Parallel to Grain: | |
| Maximum Shearing Strength (psi) | 2,480 |
| Tension Perpendicular to the Grain: | |
| Maximum Tensile Strength (psi) | 640 |
| Load Perpendicular to the Grain (lbs) | 1,700 |

**83-5.02C Tung Oil**

Tung oil must be pure Tung Oil (China wood oil) with no drying additives.

**83-5.03 Fabrication**

Fabricate decorative cover components at a shop. Fabrication must be performed in conformance with standard shop practices. The completed sections must be assembled in the shop and must be checked for straightness, alignment and dimensions. Take field measurements prior to preparation of final shop drawings and fabrication where required to ensure proper fitting of the work. Decorative cover must conform closely to the horizontal and vertical lines shown on the plans. Each cover must present a smooth, uniform appearance in its final position.

Round all exterior edges of boards to one-eighth inch radius. Sand exterior surfaces of boards with 80 grit sandpaper in the direction of the grain. Clean wood surfaces to remove all loose particles. Thin Tung Oil with two parts mineral spirits to one-part oil. Apply oil mixture to all wood surfaces as follows:

1. Liberally apply oil mixture with natural bristle brush, sponge brush, or thin foam roller.
2. Allow coast to sit a minimum of 40 minutes to soak in. When oil mixture soaks into the wood immediately apply another coat. Continue to apply coats until the surface is saturated and stays glossy. If 80 percent of the area stays glossy, the pores are saturated.
3. Wipe down the surface with clean rag material removing any excess oil on the surface. Do not allow standing oil on the surface overnight.
4. Apply one more coat to the surface and let sit for 40 minutes to a maximum of 2 hours. Wipe down surface to remove excess oil.
5. All oil mixture to cure 10 days before delivery of railing posts to project location.

### 83-5.04 Construction

Apply thread locking system to nuts and studs and anchor bolts under section 75-3.02B. Isolate galvanized steel elements in close contact with carbon steel with polyethylene tape.

### 83-5.05 Payment

Not Used

**Replace *Reserved* in section 83-6:**

## 83-6 PEDESTRIAN CABLE HANDRAILING

### 83-6.01 General

#### 83-6.01A Summary

Section 83-6 includes specifications for fabricating and installing the pedestrian handrailing. Handrailing consists of stainless steel posts, horizontal stainless steel rub rail, horizontal stainless steel cables, stainless steel hardware, and miscellaneous steel connection plates and embedded gusset plates.

Miscellaneous steel, stainless steel, hardware, and welding must comply with section 75.

Hot-dip galvanize miscellaneous steel under section 75-1.02B.

#### 83-6.01B Abbreviations

Reserved

#### 83-6.01C Submittals

Submit a certificate of compliance for stainless steel to be shipped. Submit complete shop drawings for each railing assembly. The shop drawings must include the following:

1. Railing layout
2. Material specifications and complete details of the railing, installation hardware, and anchorage components
3. Details on the fabrication and erection of the railing
4. Type and location of all fasteners

The shop drawings must be supplemented with structural calculations for the horizontal cables. Calculations must be signed by a person who is registered as a Civil Engineer in the State. Calculations must be based on elastic method and must include allowable stress analysis for cables and connections.

The horizontal cables must be designed to withstand a horizontal normal load applied to the flexible steel mesh cable of 50 pounds on an area not to exceed 12 inches by 12 inches including openings and space between the rails and located to produce the maximum load effects.

For initial review, submit 5 sets of drawings. Allow 20 days for review.

Prior to fabrication of the production handrailing, fabricate a mock-up of at least two segments, consisting of three posts with the horizontal rail, steel cables, and mesh, delivered to the site to evaluate the quality, fit and finish of the handrailing assembly. Each assembly mock-up must be fabricated and finished using the same materials and methods to be used for the production handrailing. Mock-up shall demonstrate each unique detail related to the railing system including rub rail splices, cable hardware terminations, lighting, and conduit attachments.

If ordered, additional handrailing mock-ups must be furnished until the specified quality, fit, and finish are obtained.

The handrailing mock-up authorized must be used as the standard of comparison in determining the acceptability of the production railing.

All materials used in the handrailing mock-ups must become the property of the Contractor and must be removed and disposed of by the contractor.

#### 83-6.01D Quality Assurance

Reserved

### 83-6.02 Materials

#### 83-6.02A General

Railing parts must be interchangeable with similar parts, regardless of the source.

Stainless steel components must have number 4 brushed finish.

**83-6.02B Components and Hardware**

Bridge lighting must be approved prior to submittal of railing shop drawings.

Steel mesh must be by Carl Stahl or approved equal.

**83-6.02C Vertical Cables Assemblies**

Cable assemblies must be steel wire rope swaged at each end with vandal resistant adjustable forked clevis. The clevis must have a minimum one inch of thread length. All assembly materials must be type 316 stainless steel.

**83-6.02D Horizontal Railing, Post Splice Plates and Hardware**

Horizontal pipe railing, fin plates, and post splice plates must be type S32205 duplex stainless steel FY = 65 ksi. Stainless steel hardware must be ASTM F593 AH Grade 105 stainless steel.

**83-6.02E Rail Post Base Plates**

Rail post base plates must have galvanic isolation from anchor bolts and bar reinforcement. Method of galvanic isolation must be provided in railing shop drawings.

**83-6.03 Fabrication**

Fabricate railing components at a shop. Fabrication must be performed in conformance with standard shop practices. The completed sections must be assembled in the shop and must be checked for straightness, alignment and dimensions. Take field measurements prior to preparation of final shop drawings and fabrication where required to ensure proper fitting of the work. Railing must conform closely to the horizontal and vertical lines shown on the plans. The railing must present a smooth, uniform appearance in its final position. Railing posts must be fully assembled prior to delivery to the job site.

**83-6.04 Construction**

The railings must be carefully erected true to line and grade. Posts and cables must be vertical within a tolerance not to exceed 0.02-foot in 10 feet. Adjacent rail sections must align with each other within 1/16 inch. Prior to rail installation, inspect the posts for correct alignment and conditions for proper attachment and support of the rails.

Apply thread locking system to nuts and studs and anchor bolts under section 75-3.02B.

**83-6.05 Payment**

Not Used

^^^

4. In grade linear RGBW LED flood lighting
5. Flexible LED strip lighting mounted to underside of bench
6. Landscape LED spot light in planters
7. LED spot light mounted in gnomon tip
8. Frosted and Tempered laminated glass lens for gnomon tip (deferred submittal to be designed by the fabricator)
9. Control systems including: Media server controllers, DMX controllers, touchscreen interface, Ethernet switches, wireless access point, keyboard and mouse
10. Electronic drivers, nodes, extenders, networking items
11. Power supply
12. Mounting clips, brackets, and hardware
13. Manufacturer's specified cables, connectors, and wiring
14. Lighting systems integration, programming, and testing

**87-9.01B Definitions**

**System Integrator**: Lighting professional who integrates the lighting, power supply, lighting control systems, dimming and distribution, and programs lighting control and lighting scenes for the project.

**87-9.01C Submittals**

The following shall be submitted during the bidding process:

1. Proof of experience of the System Integrator as specified under 87-9.01D.
2. A list of at least five previously completed lighting integration projects of similar scope and purpose for approval. The list must include a description of the project, relative size, and contact person with phone number.

Within 14 days of contract approval, submit 2 copies of a list of lighting products to be furnished with manufacturer, catalog and model designations. The list must include estimated delivery date for each item.

Submit 5 sets of shop drawings of lighting fixtures. Shop drawings must include:

1. Name of project
2. Fixture type with manufacturer name
3. Lighting fixture catalog number and catalog number for lampholders, ballasts, diffusers, internal protective components
4. Clearances, dimensions, weights, components, mounting hardware, materials, material thickness, and material finishes
5. Custom details as needed to accommodate mounting and integration with other lighting components, include a minimum of three views indicating fabrication and assembly methods
6. Specifications of lighting equipment, electrical, mounting, and accessory hardware
7. Shop drawings for lighting fixtures mounted in continuous rows or in architectural coves must indicate exact locations, layout, connecting components, coupling plates, changes in elevation, corner details, assembly methods, and reinforced concrete base details.

Submit 5 copies of lighting fixture data sheets indicating lighting fixture type, illustration with mounting details, certification for suitability for use in locations indicated, and photometric test reports that includes:

1. Complete candlepower summary with graphical and numerical data in 5 degree increments for up and down quadrants and at 22-1/2 degree azimuth increments including normal and parallel
2. Visual comfort probability data
3. Coefficients of utilization data
4. Luminaire efficiency
5. Lamp description
6. Lamp lumen output
7. Zonal lumens and percentages

Submit 5 copies of system integration design that includes:

1. Full system riser diagrams illustrating interconnection of system components, wiring requirements, back box sizes, and any special installation considerations

2. Full set of printed technical data sheets for equipment and lighting control cabinets
3. Detailed set of dimmer schedules
4. Detailed set of circuit and control schedules, including a complete list of all deviations from specifications.

Submit 5 copies of lighting system user manual described under 87-9.03A.

**87-9.01D Quality Assurance**

The System Integrator must have a minimum of ten continuous years of documented experience in the design, programming, and testing of architectural lighting systems.

Before shipping material to the job site, submit to the Engineer test samples of each light fixture required for the project.

**87-9.02 Materials**

Luminaires, ballasts, transformers and other electrical components must comply with appropriate requirements of Underwriter's Laboratories (UL). Appropriate UL labels must be affixed to luminaires.

Pedestrian bridge lighting system components referenced on the plans consist of the components in the following table. Substitution is not allowed unless approved by the Engineer.

| Mark | Details |
|---|---|
| | |
| **RL-1** | • **Description**: Railing mounted low voltage linear White LED light with 70-degree beam spread<br>• **Location**: Underside bridge railing<br>• **Manufacturer & Catalog Number**: Wagner, (*LULS30K2070TS54)* or approved equal<br>• **Light Source**: Integral LED, 3000 k, Lumens: 77 LM/W<br>• **Watts**: 9.25<br>• **Voltage**: 277<br>• **Load Type**: LED<br>• **Dimming Type**: 0-10V (1%), 4-Wire 0-10V Dimming Module with switched mains power and 0-10V low voltage intensity control |
| **AL-1** | • **Description**: RGBW 1ft long linear LED wall wash light with 5-degree tilt and 20x80 optics<br>• **Location**: Arch lighting valance<br>• **Manufacturer & Catalog Number**: Lumen Pulse, (*LFMCRUL120_2771222WMRGBW30KWWCL)* or approved equal<br>• **Light Source**: Integral LED, 3000 k, Lumens: 3,595 lm<br>• **Watts**: 20.7<br>• **Voltage**: 277<br>• **Color**: Textured White<br>• **Load Type**: LED<br>• **Dimming Type**: DMX/ RDM Enabled |
| **SL-1** | • **Description**: RGBW 4ft long linear LED flood light with 30x90 optics<br>• **Location**: Underside of bridge overhang<br>• **Manufacturer & Catalog Number**: Lumen Pulse, (*LFMCRUL2774822WMRGBW30K30X90CL)* or approved equal<br>• **Light Source**: Integral LED, 3000 k, Lumens: 3,181 lm |

| | |
|---|---|
| | • **Watts**: 69<br>• **Voltage**: 277<br>• **Color**: Textured White<br>• **Load Type**: LED<br>• **Dimming Type**: DMX/ RDM Enabled |
| **IGL** | • **Description**: In grade linear RGBW LED light<br>• **Location**: Sundial hardscape<br>• **Manufacturer & Catalog Number**: Luminii, (Trident Outdoor *455407FHRGBWSO990848)* or approved equal<br>• **Light Source**: Integral LED, 3000 k, Lumens: 94 lm/ft<br>• **Watts**: 4.1 w/ft<br>• **Voltage**: 120-277 Universal (Integral)<br>• **Color**: Silver<br>• **Load Type**: LED<br>• **Dimming Type**: DMX/ RDM Enabled |
| **BL** | • **Description**: Flexible RGBW LED strip light<br>• **Location**: Underside of sundial bench<br>• **Manufacturer & Catalog Number**: Luminii, (Kurba Large Vertical Pixel KBL-F-V-SPI-RGBW30K*)* or approved equal<br>• **Light Source**: Integral LED, 3000 k, Lumens: 116 lm/ft (All channels on)<br>• **Watts**: 6.7 w/ft<br>• **Voltage**: 24VDC<br>• **Color**: N/A<br>• **Load Type**: LED<br>• **Dimming Type**: DMX/ RDM Enabled |
| **LSL** | • **Description**: Landscape RGBW LED spotlight<br>• **Location**: Sundial planters<br>• **Manufacturer & Catalog Number**: Color Kinetics, (Blast Powercore gen5 423-000038-01*)* or approved equal<br>• **Light Source**: Integral LED, 3000 k, Lumens: 1,893 lm (All channels on)<br>• **Watts**: 47.6 W<br>• **Voltage**: 100-277 Universal (Integral)<br>• **Color**: Black<br>• **Load Type**: LED<br>• **Dimming Type**: Data Enabler Pro (DMX or Ethernet) |
| **SL** | • **Description**: Landscape RGBW LED spotlight<br>• **Location**: Gnomon Tip<br>• **Manufacturer & Catalog Number**: Color Kinetics, (Blast Powercore gen5 423-000038-01*)* or approved equal<br>• **Light Source**: Integral LED, 3000 k, Lumens: 1,893 lm (All channels Full On)<br>• **Watts**: 47.6 W<br>• **Voltage**: 100-277 VAC<br>• **Color**: Black |

| | |
|---|---|
| | • **Load Type**: LED<br>• **Dimming Type**: Data Enabler Pro (DMX or Ethernet) |

**87-9.03 System Integration**

**87-9.03A General**

Provide all integration, programming, and testing of the lighting system shown on the plans and in the specifications. The lighting system must be designed for the control of architectural DMX color changing lighting and must consist of factory pre-wired dimming and processing rack enclosures containing dimmers, power supplies, breakers, terminals, and/or control electronics. The system must include all dimming, control, and distribution from the System Integrator to the electrical contractor to provide a complete working system. The system must work in conjunction with specified low-voltage control stations.

The Systems Integrator must:

1. Review the lighting system shown on the plans and in the specifications and provide recommendations for improvement. Changes to systems, materials, and equipment must be approved by the Engineer
2. Select exterior rated vandal resistant lighting control cabinets to house the lighting control and lighting interface equipment. Submit manufacturer data sheets for approval under section 87-9.01C. Cabinet shall be climate controlled to maintain a maximum interior temperature of 104 °F.
3. Provide all site integration of control, dimming and distribution
4. Review all drawings for quantities of product and type
5. Interface with electrical and general contractors to ensure complete and working system
6. Install all low voltage control stations, terminate wire provided by electrical contractor and mount low voltage stations to back box provided by electrical contractor
7. Provide system turn-on and all low voltage terminations and test all equipment in the lighting system
8. Implement the lighting design with scene creation at the direction of the Engineer
9. Test onsite light levels of designed system and programmed scenes to verify light levels are within required minimum. Testing must be performed onsite with light meters to verify footcandle levels across the bridge and approach walkway to the bridge.
10. Prepare drawings and a user manual for all lighting controls, dimming systems, and scene programming
11. Provide training for City staff on the lighting system

**87-9.03B Lighting Control**

**87-9.03B(1) Summary**

Section 87-9.03B includes specifications for the performance of the lighting system.

**87-9.03B(2) Overall Lighting Control**

All lighting on must be switched or dimmed on a daily basis and controlled through a centralized lighting control network capable of supporting the following:

1. Astronomical Time Clock
2. Time of Day (TOD) events
3. Photocell input to override astronomical time clock in the event of inclement weather
4. Recall preset Scenes locally
5. Ability to program lighting or show sequence anywhere access to data is available

The centralized lighting control network must be capable of executing Global Presets to all lighting on the project site either through a local processor or by synchronizing multiple processors. Program the following Global Presets:

1. Global Preset 1 – Daytime (sunrise +45 minutes)
2. Global Preset 2 – Dusk (sunset -45 minutes)

3. Global Preset 3.A – Evening (6:45 PM – 10:00 PM)
4. Global Preset 4.A – After Hours (10:00 PM – 12:00 AM)
5. Global Preset 5.A – Overnight (12:00 AM – sunrise)

The centralized lighting control network must be capable of executing scenes that will override the Global Presets. Once the Scene has played, the lighting will have a slow fade returning to the current Global Preset at the specified time.

**87-9.03B(3) Architectural Lighting Control**

Architectural lighting with dimmed main power for control must be switched or dimmed by utilizing a system centralized or distributed dimmer and/or relay cabinets. All architectural lighting with static white lights are either dimmed with MLV or 0-10V dimming interface.

Dimming set up for architectural fixtures:
1. Global Preset 1: Fixtures will operate through astronomical time clock and photocell. Fixtures will be on and dimmed to a preset determined level onsite, light levels verified with a light meter. Once the daylighting reaches a certain brightness level, the architectural fixtures will fade off.
2. Global Preset 2: Fixtures will operate through astronomical time clock and photocell. Fixtures will be off and fade on to a preset determined level onsite, light levels verified with a light meter.
3. Global Preset 3.A: Fixtures will operate through astronomical time clock and photocell. Fixtures will maintain a preset light level from the Dusk setting. The fixtures will be at the brightest level during this period.
4. Global Preset 4.A: Fixtures will operate through astronomical time clock and photocell. Fixtures will dim from the Evening setting with a soft fade to a preset determined level onsite, light levels verified with a light meter.
5. Global Preset 5.A: Fixtures will operate through astronomical time clock and photocell. Fixtures will dim from the After Hours setting with a soft fade to a preset determined level onsite, light levels verified with a light meter.

**87-9.03B(3) Scenes Control**

Program scenes to the light fixtures using DMX control. The pre-programmed scenes must be controlled through the onsite ETC DMX controller. The Systems Integrator must pre-program the scenes and provide a mock-up demonstration for approval by the Engineer. The pedestrian bridge and sun dial shall mimic lighting scenes during certain holidays such that they are read visually as a pair.

Program the following scenes
1. Scene 1, Typical:
    a. During Daytime, the DMX fixtures on the bridge and sun dial will be off. They will be triggered to be on at dusk and evening-overnight.
    b. When the fixtures are on, they will be at a static white as a standard color most of the year with the exception of holidays or events at the discretion of the Port of LA. The fixtures will be dimmed to a preset level onsite, verified light levels with light meter. The bridge shall be static white on the arch rib and soffit and the sun dial shall be static white in all of the in grade, bench, landscape, and gnomon tip lights with the exception of the hour and ¼ hour markings that denote the current time. The hour markings are to be shown as blue and the quarter hour markings as yellow.
    c. Independence - This holiday scene is static and showcases red on the arch rib and blue on the soffit of the deck for the bridge. For the sun dial all of the hour and quarter hour markings shall be white, the bench and landscape lights as red, and the gnomon tip as blue. All of the hour and quarter hour markings not useful in telling the current time shall be dimmed by 25%. This scene will recur annually and turn on only at sunset on July 4$^{th}$ and turn off on July 5$^{th}$ at sunrise.
    d. Happy Holidays - This scene displays a two-tone color combination that is static and shows as one color on the arch rib and another on the soffit for the bridge. For the sun dial, one color shall be set for the hour and quarter hour markings and another for the bench and landscape with the gnomon tip remaining white. Time shall be denoted by dimming down at the hour and quarter hour markings by 25% that are not useful in telling the current time. At Christmas, the color combination shall be set as red and green, Hanukkah white and blue, Thanksgiving orange and red, Halloween orange and purple.

e. Rainbow - This scene is static and shall show the arch rib as a rainbow of colors from the north to the south with the soffit remaining white. For the sun dial, the hour and quarter hour markings shall show as a rainbow clockwise with the current hour and quarter hour markings along with the bench, landscape, and gnomon tip as white.
f. Intersection - This is a dynamic scene that displays the arch rib lights as yellow with a rolling red segment that fades to orange and blends gradually with the yellow across four light fixtures in either direction. The soffit lights shall remain a dimmed white such that the arch rib light is visually dominant. The red shall start where the arch rib intersects the deck at the northern end as well as the southern end where it intersects finish grade. The two red segments then roll toward the middle intersection of the arch rib and deck at the northern end of the main span. The velocity of the rolling shall differ in the “delta frame” region by comparison to the arch rib that rises above the deck such that they are timed to arrive at the middle intersection at the same time. This will yield a slower roll in the delta frame given its shorter length and a faster roll in the arch rib above deck and the segment under the deck to the south given its longer length. Once the red rolling from the north meets the red rolling from the south, they are to have a burst of luminous intensity and reverse movement back to their origins and repeat. For the sun dial, this scene shall be realized in the bench light only with the in-grade markings, landscape, and gnomon tip remaining static white. The bench light shall show as yellow with two red segments starting on opposite sides of the circle then colliding at one end and bouncing back to the opposite in a back-and-forth sequence. The total sequence for both from the start to the meeting at the intersection, and back to the starting point shall occur over a three-minute time period.
g. Built Up – This is a dynamic scene that shows the arch rib as white light with a buildup of sky-blue light over a set period. The soffit lights shall remain white and dimmed such that the arch rib light is dominant. The scene begins with sky blue light emerging from the apex of the arch rib and falling down the arch rib to the north and south at a velocity that matches the inclination of the arch. At the northern end this light will start to stack up at the bottom of the delta frame and at the southern end it will start to stack up where the arch rib intersects finish grade. The sky-blue light then continues to stack up in fixture lengths until it reaches the apex of the arch in the main span. Once all of the arch rib is filled with the sky-blue light the intensity is to gradually build to a flash over a period of five seconds and then repeat. For the sun dial, this sky-blue light is to be realized in the bench light where as the hour and quarter hour markings, landscape, and gnomon tip is to remain white. Sky-blue light shall then emerge from the northern apex of the circular light in plan and roll clockwise all the way around to the beginning. Once the sky-blue light builds up around the circle it too shall feature a gradually built up flash of light that matches the sequence and timing with the bridge. This sequence from start to finish shall occur over an hour.
h. Rams – This is a dynamic scene that shows the arch rib with a color combination of blue and yellow for Ram home games and the soffit as dimmed white light to allow the color on the arch rib below deck to show dominant. Transversely, the arch rib shall show one color on one side and another color on the opposite side. These colors shall then feature a rolling effect where an increased intensity of light rolls from one end of the arch rib where it intersects the deck at the northernmost end to the south where it intersects finish grade. This light is to re-emerge at the northern end and repeat the motion over the course of a minute every half hour. For the sun dial, the circular bench light is to be split into an east and west half with blue or light blue in the west half and yellow in the east half. These lights are pulse from dim to bright over the course of ten seconds with ten seconds of constant luminosity before repeating. All other lights in the sun dial are to remain white.

**87-9.04 Construction**

Not Used

**87-9.05 Payment**

Not Used

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

# DIVISION XI MATERIALS

## 90 CONCRETE

**Replace the 4th paragraph of section 90-1.02B(3) with:**

The SCM content in concrete is not required to comply with one of the following:

**Add to section 90-1.02G(6):**

For concrete at abutments, pier footings, and pier columns in contact with soil, the ratio of the quantity of free water to the quantity of cementitious material must not exceed 0.45.

**Add to section 90-1.02H:**

Concrete at pile caps is in a corrosive environment.

Replace the 7th paragraph of section 90-1.02H with:

For structures, the total cementitious material must be composed of one of the following options, by weight:

1. 20 percent natural pozzolan or fly ash with CaO content of up to 10 percent, 5 percent silica fume, and 75 percent Portland cement or Type IL cement.
2. 12 percent silica fume, metakaolin, or UFFA, and 88 percent Portland cement or Type IL cement.
3. 50 percent GGBFS and 50 percent Portland cement or Type IL cement.
4. 25 to 50 percent fly ash with a CaO content of up to 10 percent, and no natural pozzolan. The remaining portion of the cementitious material must be (1) Portland cement, (2) Type IL cement, or (3) a combination of Portland cement or Type IL and UFFA, metakaolin, GGBFS, or silica fume.

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

# APPENDIX "I"

# PIPELINE TEST REPORT

**PIPELINE TEST REPORT**

**DATE:**_____

**JOB NUMBER:**_____ **ELEMENT:**_____

**INITIAL TEST:**_____ **RETEST:**_____

**SYSTEM TESTED:**_____

**SECTION TESTED:**_____

**PLAN**
**PAGE#:**_____

**PIPE MATERIAL:**_____

**TYPE OF TEST:**_____

**TEST MEDIUM:**_____

**TEST PRESSURE:**_____

**TEST DURATION:**_____

**TEST START TIME:**_____**FINISH:**_____

**PRESSURE LOSS/GAIN:**_____

**REASON FOR LOSS/GAIN:**_____

_____

**ACTION TAKEN:**_____

_____

**TEST PERFORMED BY:**_____
Print Name

_____
**DATE** **NAME OF CONTRACTOR**

**TEST WITNESSED AND ACCEPTED BY:**_____
Print Name

_____
**DATE** **BUREAU OF CONTRACT ADMINISTRATION**

c/c City of Los Angeles Project Engineer
Project Test Report File
DIV15.MCH\15005.WP

# APPENDIX "J"

# LADWP ELECTRICAL COMMITMENT DRAWINGS

| | |
|---|---|
| CUST | 1 |
| ENGR (DH) | 1 |
| ESR (210) | 2 |
| DDFT | 1 |
| FILE | 1 |
| | |
| TOTAL | 6 |

## SCHEDULE

1. IN ORDER TO AVOID SCHEDULING DELAYS IN THE INSTALLATION OF LADWP EQUIPMENT FOR YOUR PROJECT, THE CUSTOMER MUST COMPLETE THE INSTALLATION AND LADWP'S INSPECTION OF THE CONDUIT, SUBSTRUCTURES, AND SWITCHBOARDS A MINIMUM OF SIX (6) WEEKS PRIOR TO THE RELEASE FROM THE LOS ANGELES DEPARTMENT OF BUILDING AND SAFETY.

2. LADWP WILL INSTALL ELECTRICAL METERS AND ENERGIZE THE ELECTRICAL SERVICE TYPICALLY WITHIN TEN (10) WORKING DAYS, AFTER ALL RELEASES HAVE BEEN OBTAINED FROM BOTH LADWP AND THE LOS ANGELES DEPARTMENT OF BUILDING AND SAFETY.

3. THE CUSTOMER MUST SUBMIT A SERVICE APPLICATION FOR EACH METER TO THE LADWP COMMERCIAL RESOURCE CENTER AT 1-800-499-8840 PRIOR TO THE METER INSTALLATION IN ORDER FOR THE SERVICE TO BE TURNED ON.

## CONDUIT

1. PRIMARY CONDUITS: 2-5" PLASTIC ENCASED BURIED TYPE (EB-35) CONDUITS ENCASED IN 3" OF CONCRETE. MINIMUM COVER FROM TOP OF CONCRETE ENVELOPE TO FINISHED GRADE, EXCEPT AT TRANSFORMER PAD, SHALL BE 30 INCHES IN PAVED AREAS AND 36 INCHES IN LANDSCAPED AREAS.

2. SECONDARY CONDUITS: 3-5" PLASTIC DIRECT BURIED TYPE (DB-120) CONDUITS. CONDUITS SHALL HAVE A MINIMUM COVER OF 24 INCHES.

3. WHEN THE PRIMARY CONDUITS ARE BEING INSTALLED ON FILLED GROUND, FOUR #4 REINFORCING BARS SHALL BE INSTALLED IN THE CONCRETE ENVELOPE.

4. ALL PLASTIC CONDUITS SHALL BE IN ACCORDANCE WITH RECOGNIZED STANDARDS. FOR PVC THE STANDARD IS ASTM F-512 AS LAST REVISED. CONDUIT MAY BE SUBJECTED TO TESTING BY THE LADWP AT THE REQUEST OF THE LADWP ELECTRIC SERVICE REPRESENTATIVE.

5. CONDUIT SHALL BE MANDRELLED WITH A MANDREL PROVIDED BY THE LADWP. INSTALL A FLAT, WOVEN MULTI-FIBER POLYESTER RIBBON, MINIMUM 3/8-INCH NOMINAL WIDTH AND 1250 POUND MINIMUM TENSILE STRENGTH PULLING TAPE IN ALL DUCTS. THE PULLING TAPE SHALL BE PRINTED WITH THE RATED TENSILE STRENGTH AND SEQUENTIAL FOOTAGE MARKINGS WITH LEGIBLE AND STABLE PRINT THE TAPE SHALL BE IN ONE CONTINUOUS LENGTH THROUGH EACH DUCT WITH NO CUTS, SPLICES OR TIES ALLOWED.

## STRUCTURE

1. PROVIDE AND INSTALL ONE 8' X 10' TRANSFORMER PAD WITH HANDHOLE AND PROTECTIVE BARRIERS IN ACCORDANCE WITH LADWP UGCS P721-(00-00.8) AND UB721-07 GROUP 1 AS LAST REVISED.

2. THE LOS ANGELES DEPARTMENT OF BUILDING AND SAFETY REQUIRES A BUILDING PERMIT FOR STRUCTURES EXCEEDING 48 INCHES IN DEPTH, INSTALLED ON PRIVATE PROPERTY.

3. THE CONDUIT, STRUCTURE, AND SERVICE POINT SHALL BE LOCATED AS SHOWN UNLESS CHANGES ARE APPROVED BY THE LADWP DESIGN ENGINEER AND CONFIRMED BY THE CUSTOMER.

## STAGING AREA

1. THE CUSTOMER'S STAGING AREA MUST BE BUILT TO SUSTAIN A MINIMUM LOAD CAPACITY OF 24 TONS PER LADWP UGCS P721-00.4 & -00.5.

2. THE LADWP HAS APPROVED A NON-STANDARD STAGING AREA FOR THE INSTALLATION AND MAINTENANCE OF THE LADWP TRANSFORMER IN THE CUSTOMER'S PROPOSED LOCATION. ANY REPAIRS NECESSARY TO THE SIDEWALKS, DRIVEWAYS, AND CURBS DURING THE INSTALLATION AND FUTURE MAINTENANCE OF THIS TRANSFORMER WILL BE THE RESPONSIBILITY OF THE PROPERTY OWNER IN ACCORDANCE WITH LOS ANGELES MUNICIPAL CODE SECTION 62.104.

## METHANE ZONE

1. THIS SITE IS CLASSIFIED AS A METHANE ZONE AND MUST COMPLY WITH THE REQUIREMENTS SPECIFIED IN LADWP UGCS H-242.

2. TP 127-R REQUIRES THE FOLLOWING:
   A. METAL GRATING ACCESS COVER PER LADWP UGCS UB728-01.
   B. 18-INCH CONCRETE ANCHOR AT EACH CONDUIT ENTRANCE.

3. MS 400A REQUIRES A SEPARATED UNDERGROUND PULL SECTION FOR VENTING WITH GAS SEALS, LOCATED OUTSIDE OF THE BUILDING.

## FAULT CURRENT

THE MAXIMUM AVAILABLE SYMMETRICAL FAULT CURRENT AT THE RESPECTIVE SERVICE POINT WILL BE AS FOLLOWS:

| SERVICE | AMPS | VOLTAGE | PHASE | WIRE | FAULT CURRENT |
|---|---|---|---|---|---|
| PS | 600A | 480Y/277V | 3-PHASE | 4-WIRE | 30,000 AMPERES |

## CUSTOMER CHARGES

THE LADWP WILL BILL THE CUSTOMER $17,016 FOR TRANSFORMER DEPOSIT FEE. DEPOSIT FEE IS ELIGIBLE FOR REFUND AFTER FIVE YEARS PER LADWP RULE 16-E, ELECTRIC SYSTEM OF THE RULES GOVERNING WATER AND ELECTRIC SERVICE. ANY CLAIM FOR THE REFUND MUST BE MADE BEFORE ONE YEAR FOLLOWING THE END OF THE FIVE-YEAR PERIOD.

## PROPERTY LINES

PROPERTY LINES ARE TO BE LOCATED BY THE CUSTOMER'S SURVEYOR.

*THIS COMMITMENT IS VALID FOR SIX MONTHS ONLY.*
*ANY CHANGE IN LOAD OR DESIGN WILL REQUIRE*
*REVISED PLANS TO BE SUBMITTED FOR RE-EVALUATION*

| No. | DATE | INIT'L | REVISION | APP'V'D |
|---|---|---|---|---|
| | | | | |
| | | | | |

**METHANE ZONE**
**REFER TO DWG H-242**

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
POWER SYSTEM ENGINEERING

| | |
|---|---|
| DESIGN: D HOLMAN | PHONE: (213) 367-6083 |
| O.K. | DRAFTING: R FIERRO |
| APPROVED | DATE: 04/24/2024 |

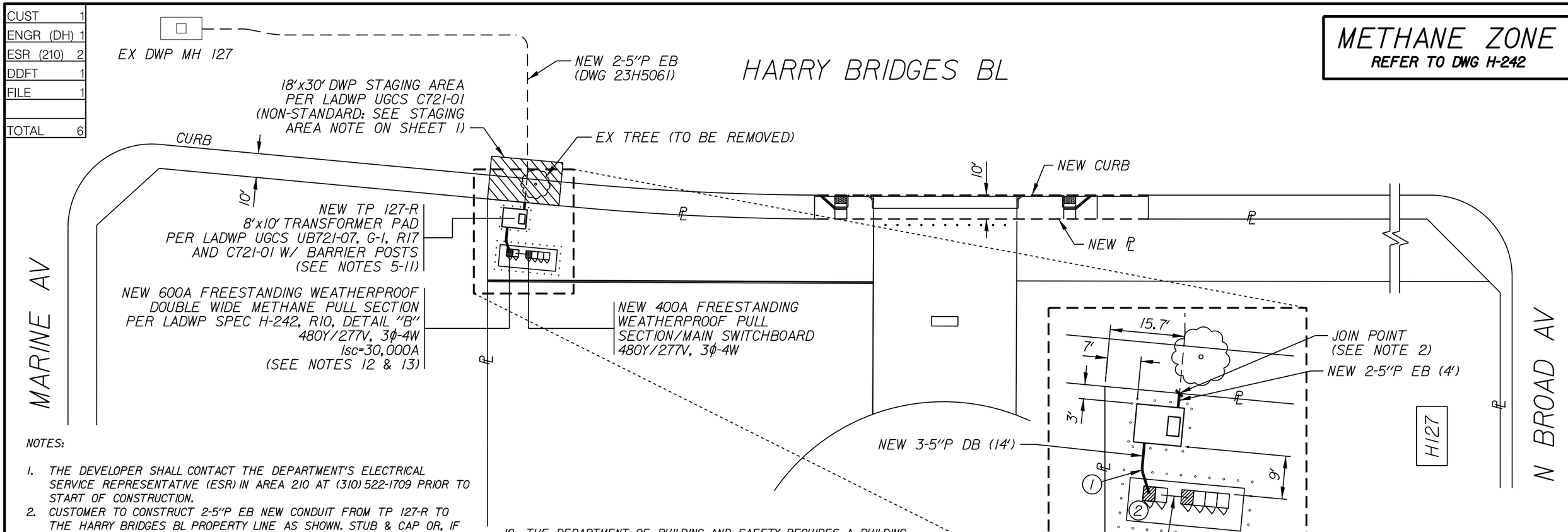
| WR #: | PROJECT #: | TG #: |
|---|---|---|
| 2519477 | P315721 | 824-E1 |

*4.8kV CUSTOMER SERVICE REQUIREMENTS*
*127 N BROAD AV*
*AVALON PROMENADE GATEWAY*
*PORT OF LOS ANGELES*

24P0034

| | |
|---|---|
| CUST | 1 |
| ENGR (DH) | 1 |
| ESR (210) | 2 |
| DDFT | 1 |
| FILE | 1 |
| | |
| TOTAL | 6 |

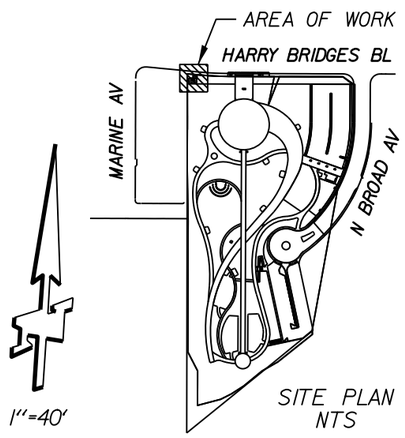
**METHANE ZONE**
**REFER TO DWG H-242**




NOTES:

1. THE DEVELOPER SHALL CONTACT THE DEPARTMENT'S ELECTRICAL SERVICE REPRESENTATIVE (ESR) IN AREA 210 AT (310) 522-1709 PRIOR TO START OF CONSTRUCTION.
2. CUSTOMER TO CONSTRUCT 2-5"P EB NEW CONDUIT FROM TP 127-R TO THE HARRY BRIDGES BL PROPERTY LINE AS SHOWN. STUB & CAP OR, IF PUBLIC PROPERTY CONDUIT CONSTRUCTION PERMIT IS AVAILABLE, CONTINUE CONDUIT CONSTRUCTION IN PUBLIC PROPERTY ACCORDING TO PERMITTED DRAWING 23H5061. DO NOT BEGIN PUBLIC CONDUIT CONSTRUCTION UNTIL THE PERMIT HAS BEEN OBTAINED. COORDINATE WITH LADWP ESR.
3. CUSTOMER TO CONSTRUCT 3-5"P DB NEW CONDUIT FROM TP 127-R TO THE 600A METHANE PULL SECTION.
4. CONDUIT RUN FROM THE 600A PULL SECTION TO THE 400A MS MUST BE CONTINUOUS PER LADWP ELECTRIC SERVICE REQUIREMENTS MANUAL PAGES 3-6 & 3-7 AND FREE OF PULL AND SPLICE BOXES. THE LADWP ELECTRIC SERVICE REPRESENTATIVE SHALL INSPECT AND VERIFY THAT THE CONDUIT RUN IS UNBROKEN.
5. TRUCK ACCESS AND STAGING AREA MUST BE RATED AT HIGHWAY LOADING AND HAVE A 70' MINIMUM VERTICAL CLEARANCE.
6. THE AREA ABOVE AND BELOW THE TRANSFORMER PAD, INCLUDING 3 FEET AROUND THE TRANSFORMER PAD, SHALL BE CLEAR OF ANYTHING FOREIGN TO DEPARTMENT FACILITIES. SEE UGCS C721-01 FOR ADDITIONAL INFORMATION.
7. IF INSTALLING METALLIC OBJECTS IN PROXIMITY TO TRANSFORMER PAD, I.E. CHAIN LINK FENCE OR IRON GATE, REFER TO UGCS UB721-12 FOR FENCE GROUNDING AND UB980-09 FOR ROLLING GATE GROUNDING REQUIREMENTS.
8. MINIMUM 10-FOOT RADIAL CLEARANCE AROUND THE TRANSFORMER PAD IS REQUIRED FOR ALL AIR INTAKES, EXHAUST VENTS, DOORS, WINDOWS, FIRE ESCAPES, AND EGRESS PATHS.
9. INSTALL BARRIER POSTS PER UGCS C721-01 AND AS REQUIRED BY THE DWP ESR LISTED ABOVE.
10. THE DEPARTMENT OF BUILDING AND SAFETY REQUIRES A BUILDING PERMIT FOR STRUCTURES EXCEEDING 48 INCHES IN DEPTH, INSTALLED IN PRIVATE PROPERTY.
11. ANY IRRIGATION SYSTEM INSTALLED AROUND THE TRANSFORMER PAD MUST SPRAY AWAY FROM THE TRANSFORMER PAD.
12. PROVIDE A LEVEL, UNOBSTRUCTED WORKING SPACE IN FRONT OF THE ENTIRE PULL BOX PER ELECTRIC SERVICE REQUIREMENTS MANUAL PAGE 2-8.
13. THE PROJECT IS LOCATED IN METHANE ZONE. FOLLOW LADWP GAS MITIGATION REQUIREMENTS FOR INSTALLATION BY CUSTOMERS IN METHANE ZONES PER DRAWING H-242.
14. THE DWP WILL BILL THE CUSTOMER A $17,016 DEPOSIT FEE FOR THE INSTALLATION OF A TRANSFORMER ON PRIVATE PROPERTY. A REFUND MAY BE CLAIMED IF THE DEMAND EXCEEDS FIFTY PERCENT OF THE ORIGINALLY INSTALLED RATED TRANSFORMER CAPACITY FOR 48 OUT OF THE FIRST 60 MONTHS FOLLOWING THE INSTALLATION. ANY CLAIM FOR REFUND MUST BE MADE BEFORE ONE-YEAR FOLLOWING THE END OF THE 60 MONTH PERIOD.
15. WORK TO BE PERFORMED BY THE DEPARTMENT WILL NOT BE SCHEDULED UNTIL THE ASSOCIATED FEES INDICATED ON THIS DRAWING HAVE BEEN PAID.
16. FOR QUESTIONS REGARDING ELECTRICAL DESIGN CONTACT DANIEL HOLMAN AT (213) 367-6083.

| CURVE DATA | | | |
|---|---|---|---|
| ① | Δ = 22.5° | R = 4' | L = 1.57' |
| ② | Δ = 90° | R = 4' | L = 6.28' |




SITE PLAN
NTS

THIS COMMITMENT IS VALID FOR SIX MONTHS ONLY.
ANY CHANGE IN LOAD OR DESIGN WILL REQUIRE
REVISED PLANS TO BE SUBMITTED FOR RE-EVALUATION

| No. | DATE | INIT'L | REVISION | APP'V'D |
|---|---|---|---|---|
| | | | | |
| | | | | |

CITY OF LOS ANGELES
DEPARTMENT OF
WATER AND POWER
POWER SYSTEM ENGINEERING

| | |
|---|---|
| DESIGN: D HOLMAN | PHONE: (213) 367-6083 |
| O.K.: M William | DRAFTING: R FIERRO |
| APPROVED: Jeff Bergman/MW | DATE: 04/24/2024 |

| WR #: | PROJECT #: | TG #: |
|---|---|---|
| 2519477 | P315721 | 824-E1 |

4.8kV CUSTOMER SERVICE REQUIREMENTS
127 N BROAD AV
AVALON PROMENADE GATEWAY
PORT OF LOS ANGELES

24P0034

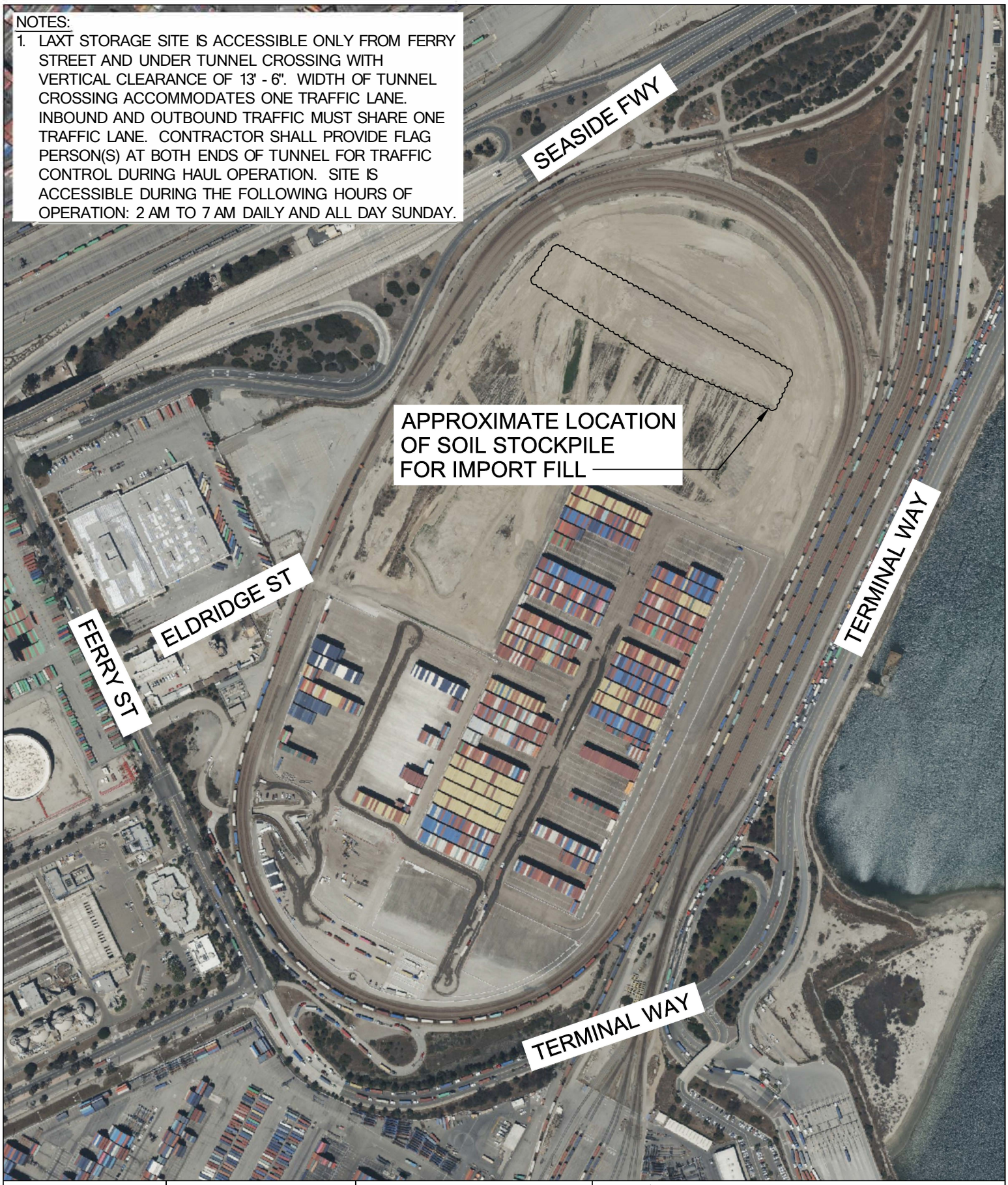
SHEET 2 OF 2

# APPENDIX "K"

# DEPARTMENT LAXT SOURCE SITE

NOTES:

1. LAXT STORAGE SITE IS ACCESSIBLE ONLY FROM FERRY STREET AND UNDER TUNNEL CROSSING WITH VERTICAL CLEARANCE OF 13' - 6". WIDTH OF TUNNEL CROSSING ACCOMMODATES ONE TRAFFIC LANE. INBOUND AND OUTBOUND TRAFFIC MUST SHARE ONE TRAFFIC LANE. CONTRACTOR SHALL PROVIDE FLAG PERSON(S) AT BOTH ENDS OF TUNNEL FOR TRAFFIC CONTROL DURING HAUL OPERATION. SITE IS ACCESSIBLE DURING THE FOLLOWING HOURS OF OPERATION: 2 AM TO 7 AM DAILY AND ALL DAY SUNDAY.




| | |
|---|---|
| FILE: DRAFT | SURVEYOR: * |
| DISC: * | DATE: * |
| SCALE: 1" = N.T.S. | REVIEWED: * |
| SHEET 1 OF 1 | APPROVED: * |

CONTROL: POLA BASE NET 2010
(EPOCH 1991.35)
HORIZ: NAD83 CA ZONE 5
VERT: MLLW
(BASED ON NGVD29)
BM: TIDAL 8 EL: 13.929'

PORT OF LOS ANGELES
CONSTRUCTION DIVISION SURVEY SECTION

K-1
LAXT BACKGROUND AERIAL