CITY OF LOS ANGELES

THE PORT OF LOS ANGELES

HARBOR DEPARTMENT

SPECIFICATIONS FOR

BERTHS 49-51 OUTER HARBOR CRUISE TERMINAL DEVELOPMENT

SPECIFICATION NO. 2815

APPL. PORT. PERMITS NO. 250115-009

CONTRACT NO. _____

CONTRACTOR _____

AMOUNT $ _____

TIME TO COMMENCE _____

TIME TO COMPLETE _____

BOARD OF HARBOR COMMISSIONERS

TRANSMITTAL 2

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01 The HARBOR DEPARTMENT of the CITY OF LOS ANGELES, California, invites electronic bids in accordance with Specification No. 2815 for BERTHS 49-51 OUTER HARBOR CRUISE TERMINAL DEVELOPMENT.

02 Project consists of the construction of a new Los Angeles Department of Water and Power (LADWP) 34.5 kV Industrial Station, new 34.5 kV switchgear, new 18 MVA transformer equipped with Automatic Load Tap Change (ALTC) to automatically adjust the necessary transformer tap changes under load, new 11 kV AMP switchgear, 2 new 11 kV wharf AMP outlets, and a 11 kV AMP mobile cable management for cruise ships connections. In addition, this Project requires the extension of a new LADWP 34.5 kV circuit through the existing LADWP underground conduit (from 22nd Street to Berth 49 along Miner Street). Project also includes Berths 49 - 50 wharf structural AMP, landside structural AMP support, Berths 49 - 50 concrete wharf repairs, furnish and install hybrid fender backing panel including steel pipe piles and timber piles, new foam-filled fendering system, new utilities including water lines and sewer connections, customer requested civil improvements to improve pedestrian and vehicular access, safety, and security for the cruise customers and operations, and site removals.

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 Department at (310) 732-3522.

04 A virtual pre-bid conference shall be held on September 23, 2025 at 9 a.m. via Microsoft Teams. Matters relating to the submittal of bids and other contents of Specifications shall be discussed. A job site walk inside the facilities shall be available for Bidders on September 30, 2025.

05 Bids must be submitted online via Port of Los Angeles CDBON system on or before 2:45:00 p.m. (PST/PDT) on November 206~~,~~ 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.

Addendum No. 4

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 13%, 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 4 Business Days after bids are closed. 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 4 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 06 above.

b Affidavit of Noncollusion.

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

d Subcontractor/Supplier Ownership and Local Business Enterprise 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 4 Business Days after bids are closed or within 4 Business Days after receiving written request from Engineer shall be cause to deem bid nonresponsive. 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 4 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 30 Calendar Days after close of bids, subcontractors and suppliers must be registered on RAMP. In addition, within 30 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 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 14 Calendar Days after Notice of Intent of 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 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.

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

23 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 00030.09 of BIDDING DOCUMENTS Section of Specifications.

24 Local Business Preference Program (LBPP) shall apply to Project. Refer to Subsection 00030.10 of BIDDING DOCUMENTS Section.

25 Submit questions to https://www.portoflosangeles.org/business/contracting-opportunities/construction-bids. Questions submitted less than 2 Business Days before close of bids may or may not be answered as time permits. Responses to questions shall be posted on Construction Division Business Opportunity Network (CDBON) at https://www.portoflosangeles.org/business/contracting-opportunities/construction-bids. The responses to questions may be updated at any time prior to the day bids are due. This shall be the only means used to communicate with Bidders other than by addendum. Department assumes no liability for Bidder's failure to attend the pre-bid conference or to review Construction Division Business Opportunity Network to obtain responses to Bidder's questions.

EUGENE D. SEROKA
Executive Director

Dated September 9, 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 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.

b Not more than 65~~35~~ percent of the monetary value of Work shall be subcontracted. The listing of more than 65~~35~~ 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 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.

Each Bidder must complete, sign, notarize, and submit as part of the bid Contractor Ownership / RAMP Outreach / Local Business Enterprise 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.

d Failure of Bidder to specify a subcontractor for any portion of Work or specifying a subcontractor that does not possess applicable, active 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 LAAC, 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 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 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.

00022.16 Cont'd.

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 / Local Business Enterprise 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 4 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 0060.01 of CONTRACTOR/SUBCONTRACTOR/SUPPLIER INFORMATION Section for suppliers necessary to meet SBE/VSBE participation requirements in conformance with Subsection 0030.06 of BIDDING DOCUMENTS Section..

e Contractor Ownership / RAMP Outreach / Local Business Enterprise 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 taking into account Local Business Preference, if applicable.

00022.17 Cont'd.

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 Notice of 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 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 CDBON online system. Hard copies are to be submitted within 4 Business Days of bid closing.
**Online: Enter information directly into online form in 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?	_____	

00022.21 Cont'd.

		Upload*	Online**
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?	_____	

		~~Upload*~~	~~Online**~~
6	CONTRACTOR OWNERSHIP / RAMP OUTREACH/ LOCAL BUSINESS ENTERPRISE 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?	_____	

00022.21 Cont'd.

		Upload*	Online**
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 _____ acknowledge ourselves jointly and severally bound to City of Los Angeles, in the sum of _____ dollars ($ _____) 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:_____, 20____.

Bidder's Name_____

By _____

_____

_____

(Surety) _____

(Surety) _____

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 _____.

02 AFFIDAVIT OF NONCOLLUSION

STATE OF _____
COUNTY OF _____
_____, being first duly sworn, composes and says that Bidder is

_____
(insert "sole owner", "partner", "president", "secretary", or other proper title) of _____

_____
(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:

_____
(Title)

Subscribed and sworn to before me

this ____day of_____, 20__
(Seal of Notary)

_____
Signature of Notary

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 shall 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 shall 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 shall 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 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 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: _____ RAMP Company ID _____

Company Address: _____

City: _____ State: _____ Zip: _____

Contact Person: _____ Phone: _____ E-mail: _____

Approximate Number of Employees in the United States: _____

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

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, the 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.

_____shall comply with Equal Benefits Ordinance requirements
Company Name
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 _____day of _____, in the year 20_____, at _____, _____
(City) (State)

_____ _____
Signature Mailing Address

_____ _____
Name of Signatory (please print) City, State, Zip Code

_____ _____
Title 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 30 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 4 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 30 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

SBEP, which has a very small business enterprise component, is a results-oriented program, requiring contractors who receive contracts from 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 4 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/Local Business Enterprise Affidavit form included in Specifications as Subsection 00030.11 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 and Local Business Enterprise Affidavit and Contractor/Subcontractor/Supplier Information Form included in Subsection 00660.01 of SBE/VSBE/MBE/WBE/DVBE/OBE/LBE 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 30 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 00030.11A. 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 00030.11A 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 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 deemed nonresponsive. The original signature copy shall be submitted with the 4-day 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 4-day documents in conformance with NOTICE INVITING BIDS Section, Subsection 09. 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 shall be deemed nonresponsive. 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 4 Business Days of the date and time of deadline for bid submittal or the bid shall be deemed nonresponsive.

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/.

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 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):
_____

Signed by: _____
(Authorized Signature)

_____
(Printed Name)

_____
(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 LOCAL BUSINESS PREFERENCE PROGRAM (LBPP)

A LBPP is based on findings that significant benefits are associated with local business preference programs. These benefits include an increase in local jobs and expenditures in the local private sector. Recognizing that (1) Harbor Department operations impact the five regional counties, especially the movement of goods throughout the southland; (2) Harbor Department conducts business with companies in all 5 counties; (3) having these businesses in close proximity to Port of Los Angeles, makes port operations more efficient; (4) these counties are currently experiencing high commercial real estate vacancy rates and high unemployment rates, LBPP aims to encourage businesses to compete for City contracting opportunities, to locate operations in the area, to encourage existing Local Business Enterprises (LBEs) to refrain from relocating to less expensive areas, and to increase local jobs and expenditures.

B Exemption:

1 Any contracts that involve an expenditure of state or federal grant funds, or contracts with any funds not entirely within the control of Harbor Department are exempt from LBPP, as well as any other contract when it is in the best interest of Harbor Department to exempt such contract prior to the date and time of deadline for bid submittal. Refer to NOTICE INVITING BIDS Section for information on whether LBPP applies to Project.

C Local Business Preference Program (LBPP): The following sets forth the specific requirements of LBPP:

1 Los Angeles Harbor Department defines an LBE as:

a A business headquartered within Los Angeles, Orange, Riverside, San Bernardino, or Ventura Counties. “Headquartered” shall mean that the business physically conducts and manages all of its operations from a location in the above-named counties; or

b A business that has at least 50 full-time employees, or 25 full-time employees for specialty marine contracting firms, working within the boundaries of Los Angeles, Orange, Riverside, San Bernardino, or Ventura Counties. A specialty marine contracting firm is a firm whose work is marine improvements, which is defined as work over, under or adjacent to water, such as dredging, installing wharves, piles, electrical above water, water systems above water, and the like.

00030.10 Cont'd.

2 Local Business Preference:

a LBPP allows LBE bidders to receive an 8 percent preference for any contract opportunity that is competitively awarded. The local preference is applicable to all construction contracts greater than $150,000. When applying the preference to construction contracts awarded based on low bid, the total price bid by an LBE shall be reduced by 8 percent. The reduced bid amount shall be deemed the amount bid by that bidder; however, the resulting contract price shall be the amount bid by the successful bidder prior to allocating the local preference percentage. The maximum preference shall not exceed $1,000,000.

b Below is an example of how the local preference is applied to contracts awarded on a low-bid basis:

	Non-local Firm	Local Firm A	Local Firm B	
Original Bid	$10,500,000	$11,000,000	$12,750,000	
8% Preference	N/A	($880,000)	($1,000,000)	*
Final Bid	$10,500,000	$10,120,000	$11,750,000	

*Maximum Preference

In the example above, Local Firm A was the lowest bidder after applying the local preference. Although the final bid amount is $10,120,000, Harbor Department would award a contract based on the original bid in the amount of $11,000,000. Harbor Department would have expended $500,000 more on the project as a result of the local preference, when compared to the bid submitted by the non-local firm.

3 Local Subcontractor/ Supplier Preference:

a LBPP allows non-local bidders to receive up to a maximum 5 percent preference if the bidder identifies local subcontractors or suppliers that shall perform Work under Contract. LBPP allows for 1 percent preference, up to a maximum of 5 percent, for every 10 percent of Work that is subcontracted to or supplied by LBEs. The maximum preference shall not exceed $1,000,000.

00030.10 Cont'd.

b LBPP applies only to first tier local subcontractors. LBPP applies also to local suppliers if they are first tier.

c The following is an example of non-local bidders with LBE subcontractors as applied to contracts awarded on a low bid basis.

00030.10 Cont'd.

	Non-Local Firm A	Non-Local Firm B	Non-Local Firm C	Local Firm D
Original Bid	$13,900,000	$13,600,000	$14,200,000	$14,500,000
Preference %	3%	0%	5%*	8%
Preference	($417,000)	$0	($710,000)	($1,000,000)*
Final Bid	$13,483,000	$13,600,000	$13,490,000	$13,500,000

*Maximum preference

		Sub-bid	Percent of bid	Percent Preference
Firm A's Subs	LBE Sub A1	$1,500,000	10.79%	
	LBE Sub A2	$2,000,000	14.39%	
	LBE Sub A3	$1,600,000	11.51%	
	Subtotal	$5,100,000	36.69%	3%
	Non LBE Sub A4	$1,150,000	8.27%	
	Non LBE Sub A5	$700,000	5.04%	
	Subtotal	$1,850,000	13.31%	
portion by prime		$6,950,000	50.00%	
	TOTAL	$13,900,000	100.00%	
	Adjusted Bid	$13,483,000		

		Sub-bid	Percent of bid	Percent Preference
Firm B's Subs	Non LBE Sub B1	$1,020,000	7.50%	
	Non LBE Sub B2	$1,110,000	8.16%	
	Non LBE Sub B3	$990,000	7.28%	
	Non LBE Sub B4	$3,680,000	27.06%	
	Subtotal	$6,800,000	50.00%	0%
portion by prime		$6,800,000	50.00%	
	TOTAL	$13,600,000	100.00%	
	Adjusted Bid	$13,600,000		

		Sub-bid	Percent of bid	Percent Preference
Firm C's Subs	LBE Sub C1	$900,000	6.34%	
	LBE Sub C2	$1,000,000	7.04%	
	LBE Sub C3	$2,390,000	16.83%	
	LBE Sub C4	$4,230,000	29.79%	
	Subtotal	$8,520,000	60.00%	5%
portion by prime		$5,680,000	40.00%	
	TOTAL	$14,200,000	100.00%	
	Adjusted Bid	$13,490,000		

00030.10 Cont'd.

d In the previous example, Non-Local Firm A was the lowest bidder after applying the preference for local subcontractors. Although the final bid amount is $13,483,000, Harbor Department would award a contract based on the original bid in the amount of $13,900,000. Harbor Department would have expended $300,000 more on the project as a result of the local preference, when compared to Non-Local Firm B. Note that fractions of a percent are rounded down when calculating percent preference.

D In order for Harbor Department staff to determine the appropriate LBE preference, Bidders shall complete, sign, notarize and submit Contractor Ownership/RAMP Outreach/Local Business Enterprise Affidavit in Subsection 00030.11 of BIDDING DOCUMENTS Section, fill out subcontractor list online provided on CDBON, fill out Contractor/Subcontractor/Supplier Information Form in Subsection 00660.01 and complete, sign, notarize and submit Subcontractor/Supplier Ownership and Local Business Enterprise Affidavit in Subsection 00660.02.

In the event Contractor claims a Local Business or local subcontractor/supplier preference in its bid and is awarded Contract, if at any time during the term of Contract, Contractor fails to remain in compliance with the requirements of the claimed preference, Contractor shall be considered in material breach of Contract. In addition to any other remedy available to Department under Contract or by operation of law, Department may withhold payments to Contractor or recover previous payments in the amount of the preference claimed in Contractor's bid and assess the costs of Department's audit of books and records of Contractor and its subcontractors/suppliers. In the event Contractor falsifies or misrepresents information contained in any form or other willful noncompliance as determined by Department, Department may disqualify Contractor from participation in Department contracts for a period of up to five years.

11 CONTRACTOR OWNERSHIP / RAMP OUTREACH / LOCAL BUSINESS ENTERPRISE 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

_____

Name of Firm

as well as the ownership thereof. Further, the undersigned agrees to provide 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)

Local Business Preference Program: Please indicate the local business enterprise (LBE) status of your company as defined in Subsection 00030.10 of BIDDING DOCUMENTS Section:

LBE (Circle One)
Non-LBE (Circle One)

If you are a non-LBE, please indicate below whether you are claiming a Local Subcontractor Preference (as defined in Subsection 00030.10 of BIDDING DOCUMENTS Section) and, if so, the preference percentage claimed (maximum preference of 5 percent).

Local Subcontractor Preference: _____ percent preference (enter percent claimed)

_____ Not claiming Local Subcontractor Preference (check if not claiming preference)

Signature _____ Title _____

Printed Name _____ Date Signed _____

NOTARY

(State of California)

County of _____)

00030.11 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

11A 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

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00030.11A 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

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12 PROPOSAL

Los Angeles, California

To Board of Harbor Commissioners:

The undersigned, having carefully examined Contract Documents for Specification No. 2815 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 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. 2815 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._____ Expiration Date _____

By_____
Signature

_____
Signature

Address _____

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

Bidder Is*_____
_____

If a partnership, state names of partners. If a corporation, state names of president and secretary.

_____

_____

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:_____ SPECIFICATION NO. 2815

PROJECT TITLE: BERTHS 49-51 OUTER HARBOR CRUISE
TERMINAL DEVELOPMENT

COMPANY NAME: _____

CONTACT PERSON: _____

COMPANY HEADQUARTERS ADDRESS: _____

CITY: _____ STATE: _____ ZIP CODE: _____

COMPANY LOCATION ADDRESS _____

CITY: _____ STATE: _____ ZIP CODE: _____

PHONE NUMBER: _____ NUMBER OF EMPLOYEES: _____

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

_____
NAME/TITLE

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, and Local Business Preference indicated below. 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.

00030.13 Cont'd.

LOCAL BUSINESS PREFERENCE (Not to Exceed $1,000,000. Reduction amount shall be applied, if necessary, by Harbor Department)

Prime is Local Business (8 percent preference)

OR

Prime is not a Local Business but subcontractor(s) or supplier(s) is(are) Local Business(es) (up to 5 percent preference. Not to Exceed $1,000,000)

The subcontractor percent preference shall be applied by Department as described in Subsection 00030.10.

REDUCED BID AMOUNT (The reduced bid amount shall be used for Award purposes)

Section	ItemCode	ItemDesc	UnitOfMeasure	Quantity	UnitPrice
Main Bid	1	Lump Sum Construction: For furnishing transportation, labor, materials, equipment, mobilization, demobilization, and incidentals necessary to complete Work, exclusive of Work covered by Bid Item 2 through the last item of Bid Proposal Line Items	Lump Sum	1	
Main Bid	2	Wharf Demolition: For furnishing transportation, labor, materials, and equipment to demolish and dispose wharf as shown on Drawings	Lump Sum	1	
Main Bid	3	Electrical System: For furnishing transportation, labor, materials, and equipment to construct the electrical system including products manufacturer's certification, quality assurance, warranty verification, and training, permits, and testing	Lump Sum	1	
Main Bid	4	Cable Management System: For furnishing transportation, labor, materials, and equipment for furnish, commission, UL certification and training of Cable Management System (CMS)	Lump Sum	1	
Main Bid	5	AMP Vaults: For furnishing transportation, labor, materials, and equipment to provide alternative maritime power (AMP) at Berths 49-51 including additions to or deductions from the approximate quantity stipulated	Each	2	
Main Bid	6	Asphalt Concrete Pavement: For furnishing transportation, labor, materials, and equipment to furnish and place asphalt concrete pavement, including additions to or deductions from the approximate quantity stipulated	Tons	1,300	
Main Bid	7	Crushed Miscellaneous Base: For furnishing transportation, labor, materials, and equipment to furnish, place, and compact crushed miscellaneous base, including additions to or deductions from the approximate quantity stipulated	Cubic Yards	1450	

SUBMIT BIDS ONLINE

Main Bid	8	Furnish 36-Inch Steel Pipe Piles: For furnishing transportation, labor, materials, and equipment to manufacture 36-inch steel pipe piles and deliver to Project Site, including surplus piles, including additions to or deductions from the approximate quantity stipulated	Linear Feet	9,144	
Main Bid	9	Install 36-Inch Steel Pipe Piles: For furnishing transportation, labor, materials, and equipment to install 36-inch steel pipe piles, including surplus piles, including additions to or deductions from the approximate quantity stipulated	Each	72	
Main Bid	10	Furnish 24-Inch Square Prestressed Concrete Piles: For furnishing transportation, labor, materials, and equipment to manufacture 24-inch square prestressed concrete piles and deliver to Project Site, including surplus piles, including additions to or deductions from the approximate quantity stipulated	Linear Feet	3,860	
Main Bid	11	Install 24-Inch Square Prestressed Concrete Piles: For furnishing transportation, labor, materials, and equipment to install 24-inch square prestressed concrete piles, including surplus piles, including additions to or deductions from the approximate quantity stipulated	Each	40	
Main Bid	12	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	13	Marine Fenders: For furnishing transportation, labor, materials, and equipment to furnish and install foam-filled and rubber fenders, including additions to or deductions from the approximate quantity stipulated	Each	10	
Main Bid	14	Mooring Bollards: For furnishing transportation, labor, materials, and equipment to furnish and install mooring bollards and related appurtenances, including additions to or deductions from the approximate quantity stipulated	Each	8	

SUBMIT BIDS ONLINE

Main Bid	15	Photographic Documentation: For furnishing transportation, labor materials, and equipment to furnish, install, and operate system for photographic documentation	Months	30	
Main Bid	16	Import Fill: For furnishing transportation, labor, materials, and equipment to furnish, place, grade, and compact in place fill soil, including additions to or deductions from the approximate quantity stipulated	Cubic Yards	570	
Main Bid	17	Marine Handrail: For furnishing transportation, labor, materials, and equipment to furnish and install marine handrail and related appurtenances, including additions to or deductions from the approximate quantity stipulated	Linear Feet	500	
Main Bid	18	Cathodic Protection: For furnishing transportation, labor, materials, and equipment to furnish and install cathodic protection	Lump Sum	1	
Main Bid	19	Staylath: For furnishing transportation, labor, materials, and equipment to furnish and install staylath	Lump Sum	1	
Contingency Item	20	Trench 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, including additions to or deductions from the approximate quantity stipulated	Cubic Yards	500	
Contingency Item	21	Restrike 24-Inch Square Concrete Production Piles: For furnishing transportation, labor, materials, and equipment to restrike 24-inch square concrete production piles, including additions to or deductions from the approximate quantity stipulated	Each	10	

SUBMIT BIDS ONLINE

Contingency Item	22	Restrike 36-Inch Steel Pipe Piles: For furnishing transportation, labor, materials, and equipment to restrike 36-inch steel pipe piles, including additions to or deductions from the approximate quantity stipulated	Each	15	
Contingency Item	23	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	20	
Contingency Item	24	Break Off and Dispose of 24-Inch Square Prestressed Concrete Production Piles: For furnishing transportation, labor, materials, and equipment to break off, remove, and dispose of 24-inch square, including additions to or deductions from the approximate quantity stipulated	Each	20	
Contingency Item	25	Soil Plug Removal: For furnishing transportation, labor, materials, and equipment for removing and disposing soil plugs in steel pipe piles, including additions to or deductions from the approximate quantity stipulated.	Each	24	
Allowance Item	~~25~~ 26	Design Modifications as Directed by Engineer: Bidder shall include in the bid the listed allowance to account for design modifications, as approved by Engineer	Lump Sum	1	100000
Allowance Item	~~26~~ 27	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	500000
Allowance Item	~~27~~ 28	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	250000

SUBMIT BIDS ONLINE

Allowance Item	~~28~~ 29	Partnering Facility: Bidder shall include in the bid the listed allowance for partnering facility as directed by Engineer	Lump Sum	1	50000
Allowance Item	~~29~~ 30	Unforeseen Contaminated, Non-Hazardous Soil, Groundwater, and Chemically Impacted Waste Soil: Bidder shall include in the bid the listed allowance to remove and dispose of contaminated, non-hazardous soil, groundwater, and chemically impacted waste soil as directed by Engineer	Lump Sum	1	500000
Allowance Item	~~30~~ 31	Modifications Due to Misaligned Piles: Bidder shall include in the bid the listed allowance to construct staylath, falsework, formwork modifications, reinforcement, and concrete required to accommodate misaligned concrete and steel piles, or as directed by Engineer	Lump Sum	1	200000
Allowance Item	~~31~~ 32	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 approved by Engineer	Lump Sum	1	200000
Allowance Item	~~32~~ 33	Wharf Repairs: Bidder shall include in the bid the listed allowance to construct wharf repairs as directed by Engineer ~~Additional Deck Concrete Due to Mislocated Piles: Bidder shall include in the bid the listed allowance to construct staylath, falsework, formwork modifications, reinforcement, and concrete required to accommodate additional deck concrete, or as directed by Engineer~~	Lump Sum	1	150000
Allowance Item	~~33~~ 34	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	50000

END OF SECTION

SUBMIT BIDS ONLINE

THIS CONTRACT (hereinafter referred to as "Contract") is made and entered into by and between City of Los Angeles, a Municipal Corporation (herein called "City"), acting by and through its Board of Harbor Commissioners (hereinafter called "Board"), and ___

_____ (hereinafter referred to as "Contractor"). The effective date of this Contract (hereinafter referred to as "Effective Date") is the date of execution by 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. 2815, 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. 2815, for BERTHS 49-51 OUTER HARBOR CRUISE TERMINAL DEVELOPMENT 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 1,020 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 30 Calendar Days commencing on the date of NTP.

2 Contract Time for the completion of Milestone 2 shall be 720 Calendar Days commencing on the date of NTP.

3 Contract Time for the completion of Milestone 3 shall be 720 Calendar Days commencing on the date of NTP.

4 Contract Time for the completion of Milestone 4 shall be 300 Calendar Days commencing on the completion of Milestones 2 and 3. No on-site Work shall be allowed 90 Calendar Days after start of Milestone 4 and shall recommence after 120 Calendar Days.

5 Contract Time for the completion of Milestone 5 shall be 30 Calendar Days commencing on the completion date of Milestones 2 and 3.

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 Specifications.

1 Completion of Work specified in Section 1.3, Paragraph A1: $2,100

2 Completion of Work specified in Section 1.3, Paragraph A2: $8,600

3 Completion of Work specified in Section 1.3, Paragraph A3: $8,600

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

5 Completion of Work specified in Section 1.3, Paragraph A5: $1,800

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 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,_____

_____

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

_____

dollars ($_____) 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 _____

_____

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,_____

_____

as principal (s) and _____

_____ 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: _____

_____

dollars ($_____) 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 City for _____

_____

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 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) shall pay the same in an amount not exceeding the sum of_____

_____

_____ dollars ($_____) 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. 2815
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. 2815 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. 2815
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. 2815, 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. 2815
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. 2815, 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: _____ Award Total: $ _____
Owner's Ethnicity: _____ Gender: _____ Group: SBE VSBE MBE WBE DVBE OBE
(Circle all that apply)
Local Business Enterprise: YES _____ NO _____ (Check only one)
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 _____

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)
Local Business Enterprise: YES _____ NO _____ (Check only one)
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)
Local Business Enterprise: YES _____ NO _____ (Check only one)
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)
Local Business Enterprise: YES _____ NO _____ (Check only one)
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: _____

_____ _____
Authorized signature Date

Refer to Subsection 00030.06 for SBE, VSBE, DVBE, MBE, WBE, and OBE definitions and refer to Subsection 00030.10 for definition of Local Business Enterprise (LBE).

02 SUBCONTRACTOR/SUPPLIER OWNERSHIP AND LOCAL BUSINESS ENTERPRISE 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

_____

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)

Please indicate the local business enterprise (LBE) status of your company as defined in Subsection 00030.10 of BIDDING DOCUMENTS Section:

Circle One:
LBE
Non-LBE

Signature _____ Title _____

Printed Name_____ Date Signed_____

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

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					
Address					
City, State, Zip					
Phone					
Description of Items Being Supplied:					

Name					
Address					
City, State, Zip					
Phone					
Description of Items Being Supplied:					

Name					
Address					
City, State, Zip					
Phone					
Description of Items Being Supplied:					

SUBTOTAL	**DEPARTMENT USE ONLY**				

END OF SECTION

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
1-3521	Berths 49-51 Outer Harbor Cruise Terminal Development

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. 2021-DCR_WSP -POLA FCAR_IU22 Photos
2. 2021-DCR_WSP -POLA FCAR_IU23 Photos
3. 2021-DCR_WSP -POLA FCAR_IU24 Photos
4. 2021-DCR_WSP -POLA FCAR_IU25 Photos
5. Geotechnical Report – Berths 49 to 51 OHCT - 20250902

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
1-390	Wharf at Berths 51-55
1-610	Wharf at Berth 49 & 50
1-618	B49-50 Fender System Renovation
1-790	Berth 51-53
1-961	Harbor Sewerage Collection System
1-1191	B49-50 Bulkloader
1-1382	B49-50 Bulk Loading Facility
1-1418	Shed Berth 228D & E
1-1453	Berths 49-50 Rock Revetment Repairs
1-1534	Berth 191-192 Maintenance Dredging
1-1602	Berth 49-55 Terminal Improvements
1-2262	Berth 49-50 Wharf Ramps
1-2276	Berths 48-52 Backland Improvements
1-2778	Cabrillo Way Marina Phase II
1-3047	Berth 49-50 Lane Victory
2-1982	Union Oil Company
6-913	Permit Map for Socony Mobil Oil Co.
6-995	Berths 51-52
6-1090	Pac. Tel. & Tel. Co.
6-1418	Rear Berth 231-232
6-913	Mobil Oil Co.

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. 2815 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 of 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 ~~days of~~ after Notice of Award ~~, and prior to, or concurrently with execution of Contract,~~ 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 71 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 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 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 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 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 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.

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)
3 Drawings
4 Standard Plans
5 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 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.

01000.21 Cont'd.

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.

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.

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.

01000.22 Cont'd.

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 I, 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.

01000.28 Cont'd.

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.

01000.38 Cont'd.

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.

01000.41 Cont'd.

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.

01000.43 Cont'd.

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.

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.

d 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.

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.

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.

01000.53 Cont'd.

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.

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.

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.

01000.55 Cont'd.

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.

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.

01000.56 Cont'd.

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.

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:

01000.56 Cont'd.

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.

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.

01000.56 Cont'd.

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.

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.

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.

01000.59 Cont'd.

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.

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 including but not limited to the following:

1. Secure necessary permits, perform coordination Work, regulatory requirements, and Project Site environmental requirements for Project.
2. Selective site and structure demolition.
3. Installation of new 11/6.6 kV Alternative Maritime Power (AMP) system for Cruise Ships at Berths 49-51.
4. Construction of a new Los Angeles Department of Water and Power (LADWP) 34.5 kV Industrial Station, new 34.5 kV switchgear, new 18MVA transformer equipped with Automatic Load Tap Change (ALTC) to automatically adjust the necessary transformer tap changes under load, new 11/6.6 kV AMP mobile cable management for cruise ships connections.
5. Installation of prestressed concrete piles at each fender location.
6. Extension of new LADWP 34.5 kV circuit through existing LADWP underground conduit.
7. Construction of wharf structural AMP, landside structural AMP support.
8. Concrete wharf repairs, furnish and install hybrid fender backing panel including steel pipe piles.
9. Installation of foam-filled fendering system.
10. Construction of utilities including water lines and sewer connections.
11. Civil improvements to improve pedestrian and vehicular access, safety, and security for the cruise customers and operations.
12. Mooring platforms.
13. Construction of electrical, water distribution, sanitary sewerage, and storm drainage systems.

14. Installation of import fill material.
15. Construction of asphalt concrete paving.
16. Chemically impacted soil (CIS) removal Work.
17. Cut and cap/plug existing utilities, sewer, electrical, and water lines.
18. Fill, compact, and grade voids and excavations caused by the demolition and removal Work.
19. Grading of Project Site.
20. Site clearing and removal of debris, equipment, and excess material from Project Site upon completion of Work.
21. Other Work as shown on Drawings.

1.2 WORK BY OTHERS

A. Department hosts Los Angeles Fleet Week from May 17 to May 26, 2026 and from May 23 to June 1, 2027. During these dates, deliveries to wharf and backland are prohibited and access to Project Site shall be limited to necessary personnel.

B. At Berths 45-47 Outer Harbor, cruise ship activity and community events shall be on-going during Contract. Engineer to notify Contractor of any necessary coordination.

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 San Pedro 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 turn left onto North Gaffey Street. Turn left onto West Seventh Street. Turn right onto South Harbor Boulevard. Turn right onto Miner Street. Continue onto Miner Street, past 22nd Street, and turn right into Project Site at the roundabout.

2. From the south, take the San Diego Freeway (I-405) north to the Long Beach Freeway (I-710) south towards San Pedro and turn right onto Harbor Boulevard. Turn right onto Miner Street. Continue onto Miner Street, past 22nd Street and turn right into Project Site at the roundabout.

B. Access to and from Project Site and any Laydown Area(s) by Contractor's personnel and equipment shall be coordinated with representatives of Ports America, the terminal operator. (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. On-site traffic control
5. Utility availability
6. Allowable loads on existing structures

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.

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. AECOM has prepared a geotechnical investigation of the site dated August 19, 2025, Project Number 60701701.

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 and terminal operator for Contractor’s equipment and vehicle traffic routes within terminal limits.

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 Miner 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.

1.8 ALLOWABLE LOADS ON EXISTING STRUCTURES

A. The existing Berths 49-50 has an allowable load limit during the construction period of 600 pounds per square foot uniform loading.

B. The existing Berth 51 has an allowable load limit during the construction period of 400 pounds per square foot uniform loading.

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. Marine coordination

2. Coordination with tenant

B. Project meetings

1.2 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 fax (909) 396-3342
City of Los Angeles Fire Department	Battalion Chief	(310) 548-7516
Terminal Operator	Octavio Sanchez	(310) 831-2097
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 Annika Tan	(213) 367-2096 (213) 367-3928
Water Service - Department Construction and Maintenance Division		through Engineer
Gas Service - Southern California Gas Company	Louie Flores	(310) 605-4172

Company or Agency	Contact	Telephone
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
11th US Coast Guard District Waterways Management	Waterways Aids to Navigation (W.A.N.) and	(310) 521-3860
	Notice to Mariners	
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

J. Department Emergency Contacts:

Company or Agency	Contact	Telephone
Port Police	Watch Commander Emergencies	(310) 732-3491 (310) 732-3500
Port Pilots	Chief Pilot Dispatch (24 hours)	(310) 732-3808 (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 (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.

1.3 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).

1.4 MARINE COORDINATION

A. Notify the following in writing 10 working days prior to starting Work on water:

1. Port Pilots

2. United States Coast Guard (USCG), in conformance with REGULATORY REQUIREMENTS Section

3. Wharfinger's Office through Engineer

4. Other terminals adjacent to Work

B. Coordinate with affected agencies, including USCG and Department Port Pilots, for navigation restrictions.

1.5 COORDINATION WITH TENANT

A. The terminal’s operations shall continue uninterrupted. Coordinate construction activities with the tenant to avoid interference with terminal operations.

1. In the event of a conflict, tenant requirements shall have priority over Contractor’s requirements in areas of active terminal operations.

2. Contractor’s personnel shall present valid photo identification at terminal entry gates upon demand. Vehicles shall have plaques or markings identifying company. Refer to REGULATORY REQUIREMENTS Section Marine Terminal Security Article for Transportation Worker Identification Credential (TWIC) program requirements.

3. Do not interfere with ship berthing, ship loading and unloading, and facility maintenance activities. Contractor shall obtain tenant's ship berthing schedule and moor floating plant outside of area required for tenant to moor vessels. Relocate interfering floating plant, materials and equipment on and under wharf as required prior to ship berthings.

B. Obtain weekly ship berthing schedule from tenant and re-confirm daily. Operator shall provide 2-day advance confirmation of ship schedules. Work is allowed when no ship is berthed.

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 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

Juneteenth - 19 June

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

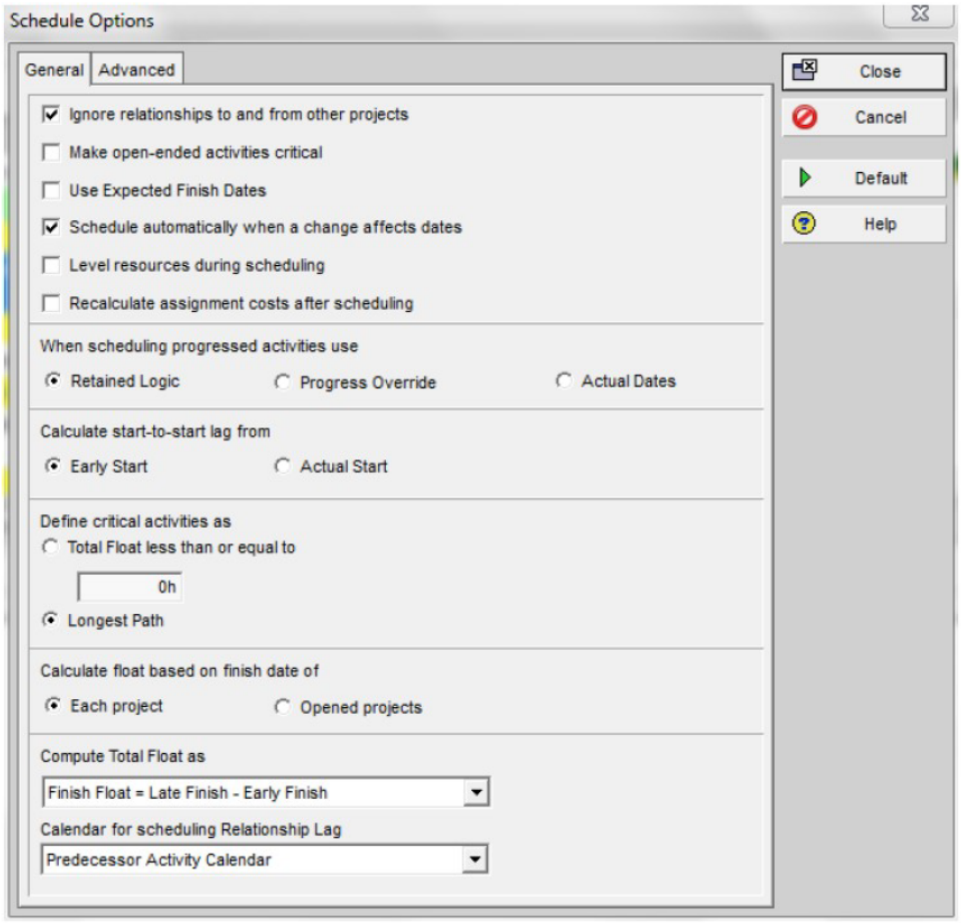
d. Calculate start to start lag from - Early start

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 Project 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 a. Schedule b. Cash Flow Curves c. Progress Curves	a. Plot and electronic b. Plot c. Plot	7 CD after acceptance of Preliminary Baseline	Once until approved*

d. Construction Equipment Report e. Manufactured Items Status Report f. Labor Curves g. Narrative Report h. Variance Report	d. Written Report e. Written Report f. Plot g. Written Report h. Electronic		
5. Monthly Updates/ Schedule Revisions a. Schedule b. Cash Flow Curves c. Progress Curves d. Construction Equipment Report e. Manufactured Item Status Report f. Labor Curves g. Narrative Report h. Variance Report	a. Plot and electronic b. Plot c. Plot d. Written Report e. Written Report f. Plot g. Written Report 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. 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: 3

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 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. 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 Lump Sum Construction bid item of Bid Proposal Line Items.

2. Include a line item for monthly mitigation measure compliance documentation on the schedule of values for the Lump Sum Construction bid item of Bid Proposal Line Items.

1.3 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 “B” 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 "B" 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.

1.4 PROJECT ENVIRONMENTAL REQUIREMENTS

A. Comply with the mitigation measure requirements outlined in Appendix "G" 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.

1.5 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), and Occupational Safety and Health Administration (OSHA) regulations.

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. Conduct pre-construction and regular coordination meetings to inform and train construction personnel about mitigation requirements.

2. 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.

3. 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.

4. Document and report non-compliance issues to Engineer. Substitute of or deviation from a specified mitigation measure or environmental requirements requires approval by Engineer.

5. Resolve non-compliance issues.

6. Compile, certify, and submit monitoring verification documentation to Engineer upon Project completion.

7. 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.

1.6 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. Protected Species Observer:

a. In order to perform monitoring to minimize impacts during pile driving activity, a qualified biologist shall be a National Oceanic and Atmospheric Administration (NOAA) approved Protected Species Observer. It is incumbent upon the qualified biologist to contact NOAA's National Marine Fisheries Service Southwest Regional Office and obtain their approval to serve as Protected Species Observer for the specified Project. The biologist shall have at least 1 year of experience monitoring for potential impacts from pile driving in harbor environments similar to Port of Los Angeles or work under the direct supervision of a qualified biologist with at least 3 years of experience observing in harbor environment.

2. Bird Nest Surveys:

a. The minimum professional qualifications for a biologist are a graduate degree in ornithology, wildlife biology, vertebrate field biology, or a closely related field, in addition to:

1) At least 3 years of professional experience studying birds and performing nest surveys;

2) At least 1 year of experience 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 range-wide population status and trends.

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 3 years documentable experience monitoring or managing projects that include this specific species.

3. Turbidity Monitoring for Impacts to Shallow Water Habitat – California Least Tern Foraging:

a. In order to perform turbidity monitoring for impacts to shallow water habitat with regard to California least tern foraging habitat, a qualified biologist shall also possess the applicable ESA Section 10(a)(1)(A) recovery permit or at least 3 years documentable experience monitoring or managing projects that include California least tern.

1.7 PROTECTION OF NESTING BIRDS

A. To comply with state and federal laws protecting nesting birds, Contractor shall have a qualified biologist conduct pre-construction surveys for nesting birds before any construction activity that disturbs vegetation, trees, or soil is performed between February 1st and September 15th. Conduct pre-construction survey within 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 after consultation with a qualified biologist and 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.

1.8 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. Sewer Cap Permit

   b. Electrical Permit

   c. Structural 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 CALIFORNIA AIR RESOURCES BOARD (CARB) REQUIREMENTS

A. On-road vehicles shall comply with CARB Clean Truck Check (Heavy Duty Inspection and Maintenance Regulation) and Advanced Clean Fleets Regulation

1. Prior to start of Work, submit to Engineer proof of compliance required by CARB for Contractor and subcontractors. Follow applicable regulatory requirements for retention of paperwork.

B. Off-road equipment shall comply with CARB off-road equipment regulations including but not limited to: In-Use Off-Road Diesel and Large Spark Ignition Regulations.

1. Prior to start of Work, submit to Engineer proof of compliance required by CARB for Contractor and subcontractors. Follow applicable regulatory requirements for retention of paperwork.

2. Prominently display appropriate signage in conformance with CARB In-Use Off-Road Diesel Regulation (https://ww2.arb.ca.gov/our-work/programs/use-road-diesel-fueled-fleets-regulation) on Project Site. Signage shall state the following:

   "Who does the In-Use Off-Road regulation apply to? The In-Use Off-Road Diesel-Fueled Fleets Regulation (Off-Road Regulation) applies to self-propelled off-road diesel vehicles 25 horsepower or greater and most two-engine vehicles (except onroad two-engine sweepers) owned or operated in California. This includes vehicles that are rented or leased (rental or leased fleets)."

1.4 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. 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.

2. Comply with SCAQMD Rules 401, Visible Emissions and 402, Nuisance.

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. Comply with SCAQMD Rule 1466 Control of Particulate Emissions from Soils with Toxic Air Contaminants.

1.5 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 materials (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) Gas: 200 cubic feet

        3) 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.

1.6 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).

1.7 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.

1.8 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.

1.9 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 and any Laydown Area(s) 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 and any Laydown Area(s) 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 and any Laydown Area(s) 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.

g. Non stormwater runoff from equipment and vehicle washing and any other activity shall be contained at Project Site and any Laydown Area(s).

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/construction.

i. Inspect Project Site and any Laydown Area(s) prior to storm event predictions to ensure that BMPs are properly installed. Conduct routine inspections of Project Site and any Laydown Area(s) 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 and any Laydown Area(s). Immediately cease Work on piles should a pollutant enter the water and notify Engineer.

B. Small Project Erosion Control Measures:

1. Small project description: Erosion prevention measures required for projects disturbing less than 1 acre of soil and are not otherwise permitted with LADBS nor covered under Construction General Permit (CGP).

2. Small project BMPs requirements: Install the following BMPs as defined by and in conformance with California Stormwater Best Management Practices Handbook:

a. Sediment control practices: Street Sweeping, SE-7. Perimeter of disturbed soil area: Silt Fence, SE-1 for slopes up to 4:1 (H:V). For slopes exceeding 4:1, Sandbag Barrier, SE-8 and Fiber Rolls, SE-5.

b. Storm drain catch basin within drainage catchment of disturbed soil area: Storm Drain Inlet Protection, SE-10.

1) Provide inlet protection at catch basins within drainage catchment regardless of whether or not the catch basins are within Project Site limits.

c. Waste management control practices: Material Delivery and Storage, WM-1; Material Use, WM-2; Stockpile Management, WM-3, Spill Prevention and Control, WM-4; Solid Waste Management, WM-5; and Concrete Waste Management, WM-8.

d. Tracking control practices: Stabilized Construction Entrance and Exit, TC-1; Stabilized Construction Roadway, TC-2, and Entrance Outlet Tire Wash, TC-3.

3. Contractor shall prepare and submit to Engineer a Best Management Practices Plan (BMPP). A sample BMPP is included in Appendix "H" of Specifications, which includes a BMP layout map and a list of BMPs to be used on-site during the duration of Project.

4. Inspect Project Site and any Laydown Area(s) prior to storm event predictions to ensure that BMPs are properly installed. Inspect Project Site and any Laydown Area(s) during and after each significant storm event where surface runoff is observed to maintain and repair damaged BMPs.

5. To purchase a copy of the California Stormwater Best Management Practices Handbook, visit https://www.casqa.org/resources/bmp-handbooks/construction.

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 weigh tickets.

C. Refer also to Hazardous Waste Article of this Section.

1.11 CORPS OF ENGINEERS PERMIT

A. Department has obtained permit No. SPL-2022-00686-TS from Department of the Army, Corps of Engineers (Corps Permit), for Berths 49-51 Outer Harbor Cruise Terminal Development. A copy of Corps Permit requirements is included in Specifications as Appendix "F". Comply with these requirements and furnish controls necessary to accomplish Work in conformance with the requirements. Make timely notifications and meet the Conditions of the Corps Permit.

B. Refer to United States Coast Guard Permits Article for additional marine construction requirements.

C. Refer to National Marine Fisheries Service/California Department of Fish and Game Requirements Article of this Section for Caulerpa taxifolia and eelgrass survey requirements.

1.12 MITIGATION MONITORING AND REPORTING PROGRAM

A. Comply with the requirements of Mitigation Measures, Monitoring and Reporting Program included as Appendix “G” of Specifications. Refer to ENVIRONMENTAL CONSTRUCTION REQUIREMENTS Section for additional requirements.

1.13 MARINE TERMINAL SECURITY

A. Comply with facility operator’s (tenant’s) security measures pursuant to 33 CFR, Chapter 1, Part 105, Maritime Security: Facilities, including, but not limited to, gate access, vehicle loading and unloading, maintaining fences, and access to restricted areas within the terminal.

1. Contractor shall comply with terminal’s approved Facility Security Plan with regards to Transportation Workers Identification Credential (TWIC) program. Provide sufficient number of TWIC-credentialed individuals such that Work can be performed without escorts provided by the terminal and be in compliance with U.S. Coast Guard Maritime Security Regulations.

1.14 NATIONAL MARINE FISHERIES SERVICE/CALIFORNIA DEPARTMENT OF FISH AND GAME REQUIREMENTS

A. Surveys for the presence of Caulerpa taxifolia and eelgrass is required prior to dredging and other significant ocean bottom-disturbing activities.

1. Department shall conduct the Caulerpa taxifolia surveys not more than 90 days and not less than 30 days prior to the activity. Notify Engineer when the 90-day period prior to the activity shall begin.

2. Department shall conduct the eelgrass surveys during the active growth period, March 1st to October 31st, and should be considered valid for a period of 60 days.

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 office including but not limited to furnishings, fixtures, supplies, and utilities.

1.2 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 office 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.

1.3 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.

1.4 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 any 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 Manager Field Office at Project Site: 36 feet by 60 feet or 2,160 usable square feet, with 5 office cubicles, 1 conference room, 1 administrative area, 1 men’s restroom, 1 women’s restroom, 1 kitchen area, and a copy/fax 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 the Construction Manager 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.

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 toiler paper, paper towels, liquid soap, and toilet seat covers.

4. Provide a local area network comprising of Construction Manager Field Office.

   a. Connect a router to a switch in Construction Manager 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 Manager Field Office. The router and switch in Construction Manager Field Office shall be placed inside the rack. The rack shall be as specified in this Section.

   c. Connect data jacks in Construction Manager Field Office patch panel.

   d. Connect the switch to the patch panel and switch in Construction Manager Field Office.

   e. Locate data jack locations in Construction Manager 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 Manager Field Office (Exhibit No. 1):

1. Construction:

2 - Offices, size 12'-0” by 13'-0" with full height (8 foot) partition walls and one 3’-0" by 6’-8" door.

2 - Offices, size 11'-0" by 12'-0" with full height (8 foot) partition walls and one 3’-0" by 6’-8" door.

1 - Office, size 13'-0" by 14'-6"with full height (8 foot) partition walls and one 3’-0" by 6’-8" door.

1 - Administrative area, 11’-0” by 12’-0” with adjacent 3’–6” counter

1 - Conference room, 21’-6” by 15' -0” with full height partition (8 foot) partition walls and double doors.

1 - Copier/fax room, 9’-0” by 12’-0” with full height (8 foot) partition walls and one 3’-0” by 6’-8” door.

1 - Men’s restroom

1 - Women’s restroom

1 - Kitchen

2. Provide the following freestanding equipment and furniture:

1 - Secretary chair

8 - Wood desks, size 2'-6" by 5'-0" with 2’-0” by 4’-0” return for computer including keyboard tray and mousepad

7 - Swivel chairs (G.E. Capital Modular Space Jr. Exec. Chair)

8 - Transparent chair floor mats

26 - Side chairs (G.E. Capital Modular Space Guest Chair)

11 - Trash receptacles

1 - 12 seat executive wooden conference table

2 - Shelves, 1'-0" deep by 3'-0" long by 6'-0" high, with multiple adjustable shelves

8 - Lockable 4-drawer legal file cabinets

4 - "Plan Hold" rolling stand series, pivot filing plan racks suitable for 36 inches by 48 inches prints

48 - "Plan Hold" binders suitable for 36 inches by 48 inches prints

6 - Dry erase white marker boards, 4’-0” by 6’-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"

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

1 - 24 port patch panel

1 - Router (Department shall assume ownership upon delivery) to include the following:

Cisco 2921 Security Bundle with SEC license PAK - CISCO2921-SEC/K9

Cisco Config Pro Express on Router Flash - ISR-CCP-EXP

Cisco 256MB Compact Flash for Cisco 1900, 2900, 3900 - ISR MEM-CF-256MB

Cisco 2921/2951 AC Power Supply - PWR-2921-51-AC

Cisco IP Base License for Cisco 2901-2951 - SL-29-IPB-K9

Security License for Cisco 2901-2951 - SL-29-SEC-K9

Cisco AC Power Cord (North America), C13, NEMA 5-15P, 2.1m - CAB-AC

Cisco SMARTNET 8X5XNBD Cisco 2921 Security - CON-SNT-2921SEC (Account assignment to be coordinated with Department)

Cisco 512MB to 1.5GB DRAM Upgrade (1GB+512MB) for Cisco 2901-2921 - MEM-2900-512U1.5GB

Cisco 2901-2921 IOS UNIVERSAL - S29UK9-15102T

Cisco GLC-LH-SM 2 Modules

1 - 24 Port Ethernet Switch (Department shall assume ownership upon delivery) to include the following:

Cisco Catalyst 3750X 24 Port PoE LAN Base - WS-C3750X-24PL

Cisco Catalyst 3K-X 715W AC Power Supply - C3KX-PWR-715WAC

Cisco StackWise 50CM Stacking Cable - CAB-STACK-50CM

Cisco CAT 3750X IOS UNIVERSAL WITH WEB BASE DEV MGR - S375XVK9T-12255SE

Cisco Catalyst 3K-X 715W AC Secondary Power Supply - C3KX-PWR-715WAC/2

Cisco AC Power Cord for Catalyst 3K-X (North America) - CAB-3KX-AC

Cisco SMARTNET 8X5XNBD Catalyst 3750X 24 Port PoE LAN Base - CON-SNT-3750X2PL

Cisco GLC-SX-MM

8 - Avaya IP Telephone Model 9611G

1 - Avaya IP conference phone Model 1692

1 - Canon Image Runner C3480 Color Copier network compatible or equivalent. Contractor shall provide maintenance and supplies for the copier throughout the duration of Contract.

6 - APC Backups Pro 700

1 - APC Net Shelter 2 Post Rack

1 - APC SMART - UPS SMT 1500

3. 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

1 - RJ45 data jack to be placed in each office, in the conference room, the administrative area, 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

4. 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.

5. Full height partition walls shall be acoustically insulated.

6. 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-cups), tea, creamer, sugar, and the like)

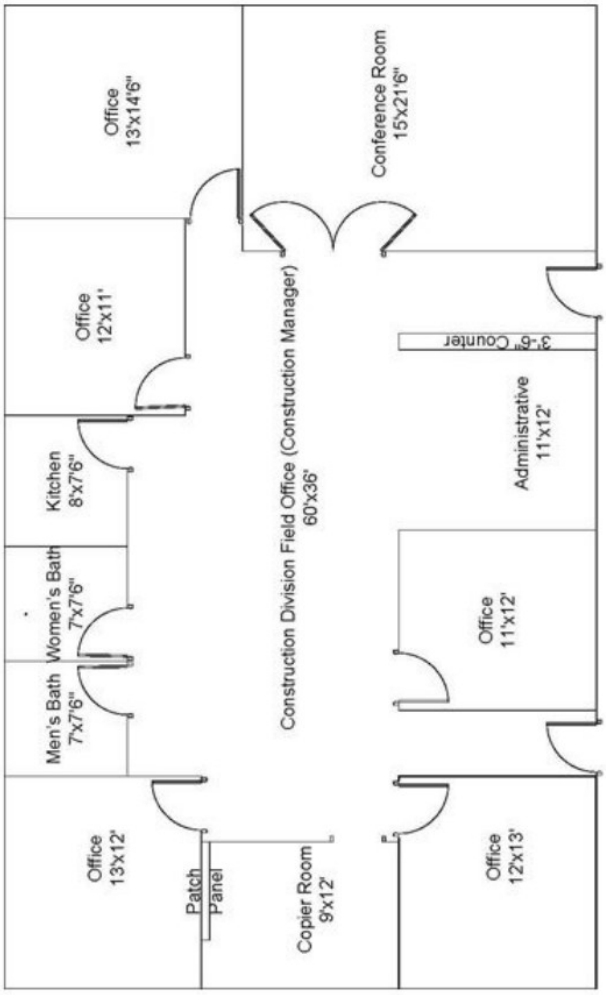
   1 - Refrigerator (minimum 14.5 cubic feet capacity)

   1 - Countertop and sink plumbed to office water and sewer system

1 - Microwave oven (750 watts)

Locate appliances as directed by Engineer.

PART 3 - EXECUTION - NOT USED



Construction Division Field Office (Construction Manager) Exhibit No. 1

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/. 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/.

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 Project 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 "C" 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 "C" of Specifications. Instructions for filling out the form are in Attachment A, Instruction Sheet for Waste Management Plan included in Appendix "C" 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 "C" 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 "C" 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 shal 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 Complete 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 Lump Sum Construction bid item 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 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 3 Bluebeam Revu Complete 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 41 16 - Structure Demolition

C. 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. 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 shall 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 3.7B 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 and STRUCTURE DEMOLITION Sections, 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. Electrical demolition.
2. Concrete demolition and removals.
3. Asphalt concrete and concrete pavement removals.
4. Curbs, ramps, gutters, driveways, and sidewalks removals.
5. Railroad track and ties removals.
6. Chain-link fencing 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. K-rail.

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 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.

C. Submit certification of removal and appropriate disposal of abandoned cables containing lead stabilizers.

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 EXAMINATION

A. Verify that abandoned wiring and equipment serve only abandoned facilites.

3.2 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

B. Coordinate utility service outages with utility company.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When Work shall be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.

3.3 DEMOLITION AND REMOVALS

A. Removal Work shall not exceed the limits shown on Drawings.

B. Remove, relocate, and extend existing installations to accommodate new construction.

C. Remove abandoned wiring to source of supply.

D. Removed exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.

F. Repair adjacent construction and finishes damaged during demolition and extension Work.

G. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

H. Control dust in conformance with REGULATORY REQUIREMENTS Section.

I. 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.

J. 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.

K. Should Contractor decide to move any large items intact off Project Site, Contractor shall make arrangements for permits, clearances, and utilities

L. 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.

M. Perform demolition and removals under Engineer's inspection in conformance with applicable safety standards and requirements.

N. Burning of material on-site is prohibited.

O. No debris shall be allowed to enter harbor waters.

P. Perform pavement removals in conformance with BASIC SITE MATERIALS AND METHODS Section.

Q. 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.

3.4 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.

3.5 OWNERSHIP AND DISPOSAL

A. Refer to BASIC SITE MATERIALS AND METHODS Section for requirements concerning ownership and disposal criteria for demolished materials.

3.6 BACKFILL EXCAVATIONS

A. Mechanically backfill voids in subgrade areas in conformance with BASIC SITE MATERIALS AND METHODS Section.

3.7 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.

3.8 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.

3.9 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. Structure demolition, removal, disposal, and salvage and other requirements to perform Work of this Section.

1. Demolition and removal of existing structures and buildings, complete, including entire foundation system to the bottom of footings and slabs as shown on Drawings.

a. Removals include, but are not limited to, electrical and mechanical equipment, fixtures, building improvements, and other related appurtenances.

2. Shut off and remove existing utility services within Project Site limits prior to demolition as follows:

3. Abandon, cap, or plug conduits and substructures.

4. Other removal Work as shown on Drawings.

5. Remove excess material from Project Site upon completion of Work.

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 included in each corresponding bid item 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. ASTM D2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

D. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

E. Reference Specifications (RS):

Section 300-4 - Unclassified Fill

Section 300-5 -Borrow Excavation

Section 306 - Open Trench Conduit Construction

1.5 SUBMITTALS

A. Demolition procedures, equipment to be used, and operational sequences.

B. Pile jetting procedures for piles that cannot be extracted by dry vibratory methods.

C. 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 CONTROL

A. Refer to SITE CONDITIONS and REGULATORY REQUIREMENTS Sections.

1.7 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. Imported fill, where required for backfill of voids, shall conform to RS Subsection 300-5, except for 300-5.4.

1. Fill 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. Excavated materials may be re-used for backfill of voids left after removals in conformance with RS Subsection 300-4 exclusive of Subsection 300-4.9 and 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 material.

PART 3 - EXECUTION

3.1 DEMOLITION

A. Concrete Wharf Structure Demolition:

1. Sawcut perimeter of demolition areas to a minimum depth of 6 inch. Remove deteriorated concrete and reinforcing to the limits indicated. Extreme care shall be taken not to damage existing reinforcing to remain in place.

B. Demolition Work shall not exceed the limits shown on Drawings.

C. Control dust in conformance with REGULATORY REQUIREMENTS Section.

D. 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.

E. 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.

F. Should Contractor decide to move any large items intact off Project Site, Contractor shall make arrangements for permits, clearances, and utilities.

G. 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.

H. Perform demolition and removals under Engineer's inspection in conformance with applicable safety standards and requirements.

I. Burning of material on-site is prohibited.

J. No debris shall be allowed to enter harbor waters.

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. Perform pavement removals in conformance with BASIC SITE MATERIALS AND METHODS Section.

3.2 SAFETY AND PROTECTION

A. Protect existing buildings, structures, 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 and Engineer has authorized in writing the resumption of Work.

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 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 to CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT Section.

3.4 OWNERSHIP AND DISPOSAL

A. Refer to BASIC SITE MATERIALS AND METHODS Section for requirements concerning ownership and disposal criteria for demolished materials.

3.5 BACKFILL EXCAVATIONS

A. Mechanically backfill voids in subgrade areas in conformance with BASIC SITE MATERIALS AND METHODS Section. Backfill with native material in conformance with EARTHWORK Section.

B. Filled areas within and around demolished building and structure footprints shall be graded to retain stormwater on Department property in conformance with EARTHWORK and REGULATORY REQUIREMENTS Sections unless indicated otherwise on Drawings.

3.6 INTERFERING CONDUITS AND SUBSTRUCTURES

A. Interfering conduits and substructures shall be handled in conformance with BASIC SITE MATERIALS AND METHODS Section.

3.7 TOXIC MATERIAL REMOVALS

A. Dispose of creosote, pentachlorophenol, or ammoniacal copper zinc arsenate (ACZA)-containing materials, including timber wharves, 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.

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

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 41 16 - Structure Demolition

D. 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, Non-Hazardous Soil, Groundwater, and Chemically Impacted Soil (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.

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. 40 CFR 761 - Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, And Use Prohibitions.

F. 49 CFR - Transportation.

1.5 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. Method for equipment decontamination after completion of PCB Work in conformance with 40 CFR 761.

5. Sampling procedure, characterization, testing, and profiling plan for CIS and potential CIS.

6. Sampling procedure and characterization plan for leachate liquids and name of independent test laboratory.

7. Submit BMPs for containing CIS and wash water within staging area.

8. 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.

1.6 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

1.7 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 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 shall 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.

H. Handle PCB contaminated soil in conformance with 40 CFR 761.

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, STRUCTURE 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. Engineer shall supply Generator's U.S.EPA ID Number required on the waste manifest. Refer to REGULATORY REQUIREMENTS Section for additional requirements.

F. Dispose of CIS in conformance with applicable bid item of Bid Proposal Line Items.

G. 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. Removal of concrete for wharf repairs.

B. Cleaning of exposed steel reinforcing bars.

C. Addition and replacement of reinforcing bars for wharf repairs.

D. Inspection and required testing of repair areas.

E. The requirements of this Section apply to the basic methods of repair specified for Project. The basic methods of repair include the following:

1. Demolition
2. Cast-In-Place Concrete
3. Hand-applied Mortaring (Trowel)
4. Reinforcing Welding and Splicing

F. Additional or special requirements for each basic method of repair are described under each repair section.

1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 03 21 30 - Reinforcing Welding

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 bid item of Bid Proposal Line Items that requires concrete repairs.
2. Payment for adding or replacing reinforcing bars shall be as specified for each method of repair.

1.4 REFERENCES

A. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

B. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

C. ASTM C150/C150M - Standard Specification for Portland Cement.

D. ASTM C615/C615M - Standard Specification for Granite Dimension Stone.

E. SSPC-SP 6 - Commercial Blast Cleaning.

F. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning.

1.5 SUBMITTALS

A. Submit the following to Engineer:

1. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.

2. Equipment:

a. Description of mechanical or waterblasting equipment to be used for each basic method of repair prior to starting Work.

3. Procedures to be used to prevent debris from falling into the water and depositing onto the shoreline.

4. Procedures to be used to prevent abrasive blasting contaminants from entering harbor waters.

5. Procedures to be used for capturing debris that have fallen into the water and deposited onto the shoreline.

6. Design for staylath and platform.

7. Reinforcing Steel for Additions and Replacement of Corroded Bars:

a. Submit 2 copies of mill test reports certifying that materials meet specified ASTM requirements.

b. Submit chemical analysis for determining carbon equivalent of steel reinforcement, which shall be welded in conformance with AWS D1.4.

8. Splicing of Reinforcing Bars:

    a. Complete and submit welding procedure form as specified in REINFORCING WELDING Section for field welding of reinforcing bars.

9. Daily Records:

    a. Submit daily records of which repairs were made, which method of repair was used, and volume and length of materials used. Records shall be signed by the Inspector.

1.6 PROTECTION AND REMOVAL OF LOADS

A. Live loads directly over a component being repaired shall not exceed the allowable loads specified in SITE CONDITIONS Section.

B. Exercise care in removing deteriorated concrete to prevent damage to the adjacent sound components. In case of damage inflicted to nearby or adjacent sound components, restore the damaged components to their original condition at no additional cost to Department.

C. Protect concrete surfaces beyond limits of surface receiving repairs against spillage or damage.

1.7 QUALITY ASSURANCE

A. Repair Material Manufacturer’s Written Instructions:

1. Comply with the manufacturer’s written instructions, particularly regarding requirements for handling, storage, protective gear, environmental limitations, mixing, and applications process.

B. Personnel Qualifications:

1. Applicators of the injection, coating, mortar, concrete, or shotcrete shall be experienced in the application of the materials as recommended by the material manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Packaging and Labeling:

1. Materials shall be delivered to Project Site in clearly labeled unopened containers or packages.

2. Labels shall be legible, intact, and indicate:

    a. Name of manufacturer

    b. Manufacturer’s product identification

    c. Manufacturer’s lot number

    d. Mix ratio

    e. Hazardous material rating and appropriate warnings for handling

B. Product Handling and Storage:

1. Handle materials in a safe manner and in a way to avoid breaking container seals.

2. Store materials at temperatures recommended by the material manufacturer.

1.9 DESCRIPTION OF DEFECTS AND DEFECT LOCATIONS

A. Definition of Defects:

1. Breakage or Partial Breakage: Cracks and spalls of concrete, caused by overstressing that result in major structural distress.

2. Overstressing Cracks: Cracks resulting from external loads, which exceeded the strength of concrete.

3. Corrosion Cracks: Cracks that occurred in concrete due to expansion of chemical products generated by corrosion of steel reinforcement.

4. Closed Corrosion Spalls: Defects that occurred as a result of incomplete separation of concrete cover due to parallel-to-surface corrosion cracking.

5. Open Corrosion Spalls: Recess in concrete surface caused by complete separation of fragment of concrete cover due to parallel-to-surface corrosion cracking.

6. Mechanical Damage: Loss of a concrete fragment, usually resulting from an impact that results in minor structural damage.

B. Description of Defects:

1. Components to be repaired and their respective method of repair are shown on Drawings.

2. Drawings contain a Defect/Repair Data Tables with the details of the defects that are to be repaired located in bid package of Specifications.

1.10 METHOD OF REPAIR

A. Repairs shall be performed only for defects as indicated on Drawings. Repairs of any additional defects shall be authorized by Engineer prior to Work being performed.

B. The method of repair is indicated on Drawings for each defect. Contractor may submit to Engineer for approval a different method of repair on an individual defect basis.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland cement concrete shall conform to RS Subsection 201-1 unless otherwise shown 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. Additional or replacement reinforcing steel shall conform to ASTM C615/C615M, Grade 60, deformed bars. Reinforcing steel that is intended to be welded shall be in conformance with REINFORCING WELDING Section.

D. Materials for filling of core holes shall be 1 of the following approved materials:

1. MasterEmaco S 488Cl, as supplied by BASF Corporation, (800) 433-9517.

2. SikaTop 123 Plus, as supplied by Sika Corporation, (800) 933-7452.

E. The approved adhesive anchor systems for installing dowels shall be as follows:

1. Hilti HIT-HY 200 system using HIT HY-200 adhesive for wet or dry applications or Hilti HIT-RE 500 V3 system using HIT-RE 500 V3 adhesive for wet, dry, submerged or water filled applications, as supplied by Hilti, (800) 879-8000.

2. Powers Fasteners Pure 110 Plus, as supplied by Powers, (714) 731-2500.

3. MasterEmaco ADH 1420 Epoxy Adhesive, as supplied by BASF Corporation, (800) 433-9517.

a. Sika Anchorfix-3001 as supplied by Sika Corporation, (800) 933-7452
PART 3 - EXECUTION

2.2 INTERFERENCES

A. Existing piping, steel framing, and utilities may interfere with concrete removal, formwork, and casting in some areas. Exercise extreme care continually to protect these appurtenances and not interfere with their operation in any way. Damage caused to these components shall be repaired by Contractor at no additional cost to Department. Avoid cutting or damaging embedded reinforcing bars, prestressing strands, post-tensioning tendons, or electrical conduits.

2.3 SURFACE PREPARATION

A. Exposed reinforcing bars, stirrups, and other embedded steel components shall be cleaned of corrosion products to a level of cleaning conforming to SSPC-SP 6/NACE No.3.

B. Necessary precautions shall be taken to prevent abrasive blasting contaminants from entering harbor waters during the repair or removal phase of Project. Confined blasting shall be performed where feasible. Confined blasting includes, but is not limited to, enclosing the material or area to be blasted with structures such as metal shrouds or canvas.

1. Perform abrasive blasting in conformance with REGULATORY REQUIREMENTS Section and SSPC-SP 6/NACE No.3.

2.4 CONCRETE REMOVAL FOR WHARF REPAIRS

A. General:

1. Perform concrete removal using appropriate mechanical or waterblasting equipment including, but not limited to, jackhammers and bushing hammers. Demonstrate to Engineer that the equipment that is intended for use on Project Site is capable of executing concrete removal conforming to the requirements of this Section.

    a. Refer to Drawings for repair area perimeter.

    b. Remove damaged concrete back to sound, parent material. Removal shall extend a minimum of 6 inches beyond the actual repair area.

    c. Repair configurations shall be preferable square or rectangular with square corners.

2. Initiate concrete removal only at the defects listed on Drawings which have a specified repair method of trowel, cast-in-place concrete, or jacket encasement. Initiation of concrete removal at other locations requires prior authorization by Engineer. Unauthorized removal of concrete at locations other than indicated on Drawings shall be considered as damage inflicted to the structure. Repair this damage at no additional cost to Department.

3. Concrete, steel, and related construction debris shall not be allowed to fall into the water or be deposited on the shoreline. Dispose of construction debris in conformance with BASIC SITE MATERIALS AND METHODS Section.

B. Reinforced Concrete Members:

1. The extent of concrete removal at a location shall be as required to remove deteriorated concrete and to expose corroded reinforcing bars beyond the limits of corrosion.

2. Concrete Removal at Corroded Main Reinforcing Bars:

    a. Care shall be taken to avoid cutting the existing reinforcing bars.

    b. Remove concrete around corroded main reinforcing bars. The minimum clearance between the reinforcing bars and the concrete shall be 1 inch. The shape of the prepared defect shall be such that feathered-out edges are avoided and the repair material shall be “keyed-in” to the repair area.

c. Concrete removal along the main reinforcing bars shall continue beyond the limit of loose corrosion products along a length of bar equal to a minimum of 10 times the bar size. The 1-inch clearance shall be maintained between the reinforcing bar and the concrete along the full length of the reinforcing bars, including the end sections free from corrosion.

d. If stirrups or ties are exposed in the process of removing concrete, remove concrete at the stirrups and ties as specified in Reinforced Concrete Members Paragraph of this Article.

3. Concrete Removal at Corroded Stirrups or Ties:

a. Removal of concrete at corroded stirrups and ties shall be done to the back of the stirrups and ties only.

4. Removal of Corroded Conduits:

a. Unused conduits may be present in some areas that are scheduled for repair. When such conduits are encountered, conduits shall be removed to a point where conduits do not interfere with the repair placement. Removed conduit sections shall be disposed of in conformance with BASIC SITE MATERIALS AND METHODS Section.

5. Bending-out of the reinforcing bars to provide clearance shall not be permitted and shall be considered as damage inflicted to the structure.

2.5 ADDITION AND REPLACEMENT OF REINFORCING BARS

A. Criteria:

1. Corroded portions of the main reinforcing bars with a loss in original diameter equal to or more than 30 percent require the placement of additional bars or replacement of corroded bars with new reinforcing bars. Measure the remaining width and depth of the reinforcing bars by caliper after cleaning bars as specified in Surface Preparation Article of this Section. The cross sectional area shall be based on the least value of 3 measurements taken along the length of the corroded bar. The locations for measurement shall be at the areas that exhibit the most extensive loss of section. The measurement results shall be reported to Engineer who shall make a determination on the necessity, extent, and method of providing additional reinforcement at the specific location.

2. Corroded stirrups shall not require additional or replacement reinforcing bars. Broken stirrups may be cut or bent back to their original position with the prior approval of Engineer. Stirrups shall be cleaned as specified in Surface Preparation Article of this Section.

3. New reinforcing bars shall not contain rust, scale, oil, grease, clay, or other foreign substances that could reduce or destroy the bond. Minor rusting of uncoated reinforcement shall not be a basis of rejection, provided rusting has not reduced the effective cross sectional area of the reinforcement below the minimum standard diameter allowed by the applicable reinforcement standard, and that rust has been removed prior to placing the reinforcing bar.

B. Addition of Reinforcing Bars:

1. The corroded reinforcing bars to be lap spliced shall not be cut. New reinforcing bars of equivalent area shall be provided alongside of the corroded reinforcing bar and lapped as shown on Drawings.

2. Addition of the new reinforcing bars shall be in conformance with the following requirements:

a. The remaining existing corroded reinforcing bars shall be cleaned in conformance with the requirements of the Surface Preparation Article of this Section.

b. The new reinforcing steel shall be placed in a manner that shall allow unobstructed placement of the repair material.

c. The new reinforcing bars shall be secured or tied to prevent sagging beyond the plane of existing reinforcement.

C. Replacement of Reinforcing Bars:

1. If compliance with requirements of the Addition of Reinforcing Bars Paragraph of the Addition and Replacement of Reinforcing Bars Article of this Section cannot be ensured, remove and replace the corroded reinforcing bar. A typical reinforcing bar replacement shall be performed using the lap splice detail shown on Drawings. The splices of 2 adjacent reinforcing bars shall be staggered as much as possible, without the removal of additional sound concrete. Lap lengths shown on Drawings are based on a 50 percent loss of cross sectional area for corroded reinforcing bars.

2. Where lap splicing is not practical due to space restrictions or other practical considerations, as determined by Engineer, the replacement steel may be installed by welding to the splice as shown on Drawings. Welding of the reinforcing steel shall conform to AWS D1.4 and can only be performed with the prior approval of Engineer. Filler material for welding the new reinforcing bars shall be based on bars having yield strength of 60,000 psi.

3. Cutting of existing reinforcing bars and splice arrangement, unless specifically called for in this Section, requires the prior approval of Engineer.

D. Addition or Replacement of Reinforcing Using Dowels:

1. In cases where insufficient length of existing reinforcement remains to be lap spliced, such as where horizontal reinforcing enters an adjoining member, dowels shall be used to achieve adequate development of the additional or replacement steel..

2. Provide adhesive anchors and rebar dowels as specified in the Materials Article of this Section.

3. Adhesive anchors and rebar dowels shall be installed in conformance with the manufacturer's written instructions.

4. Holes shall be drilled using a pneumatic, rock drill with an ANSI-compliant drill bit to ensure the proper hole dimension tolerances. No core drilling shall be permitted.

5. Avoid damaging or cutting the existing reinforcing bars.

6. If the proposed hole locations interfere with the existing rebar, contact Engineer prior to drilling.

7. Coordinate with Engineer for inspection during the addition or replacement of reinforcement using dowels.

E. Reinforcing Couplers:

1. Install reinforcing couplers in conformance with CONCRETE REINFORCING Section.

2.6 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Inspection of Prepared Surfaces:

a. After completion of the full sequence of surface preparation procedures as specified for each method of repair, the repair location shall be inspected and approved by Engineer prior to the placement of repair material. Any condition, which may interfere with the execution of Work in conformance with Specifications, shall be reported to Engineer.

2. Coring Samples:

a. Core samples to verify the quality of shotcrete and cast-in-place concrete may be required at times and locations as designated by Engineer. Contractor shall be responsible for providing the necessary equipment and for execution of coring operations in conformance with ASTM C42.

b. Coring shall be through the repair and extend into the existing concrete a minimum of 2 inches. Core diameter shall be 3 inches or as requested by Engineer.

c. Cores shall be visually inspected by Engineer for the quality of bonding and any additional testing requirements shall then be determined.

d. Fill the core holes with materials as specified in the Materials Article of this Section and finish the surface to blend with adjacent concrete.

3. Reinforcing Bar Welding:

a. Welding of steel reinforcing shall be performed by a certified welder in conformance with REINFORCING WELDING Section.

b. Defective welding shall be either partially or completely removed and repaired as determined by Engineer. The cost for repair of defective welds shall be borne by Contractor.

4. Final Inspection of Repaired Area:

a. After completion of repair, repair location shall be inspected and approved by Engineer for final payment.

2.7 CLEANING

A. Construction and demolition debris shall be disposed of in conformance with BASIC SITE MATERIALS AND METHODS Section in a manner that complies with applicable laws and regulations.

B. Leave finished Work and Work area in a neat, clean condition without evidence of spillages onto adjacent areas or into the water. Repair materials and equipment may not be left on the structure without prior approval by Wharf Operator.

C. Procedures for clean up or removal of excess repair material shall be in conformance with manufacturer's written instructions.

D. During the progress of Work, should Contractor lose, dump, throw overboard, sink, or misplace any material into the water, material shall be recovered and removed at no additional cost to Department.

PART 3 - EXECUTION

3.1 CONCRETE REMOVAL FOR SHOTCRETE, TROWEL, CAST-IN-PLACE CONCRETE, AND JACKET ENCASEMENT PILE REPAIRS

A. General:

1. Concrete removal shall be executed using appropriate mechanical or waterblasting equipment including, but not limited to, jackhammers and bushing hammers. Contractor shall demonstrate that the equipment that is intended for use on Project is capable of executing concrete removal conforming to the requirements of this Section.

   a. Remove damaged concrete back to sound, parent material.

2. Concrete removal shall be initiated only at the defects listed on Drawings which have a specified repair method of shotcrete, trowel, cast-in-place concrete, or jacket encasement. Initiation of concrete removal at other locations requires prior authorization by Engineer. Unauthorized removal of concrete at locations other than indicated on Drawings shall be considered as damage inflicted to the structure. Contractor shall be responsible for repairing this damage at no additional cost to Department.

3. Concrete, steel, and related construction debris shall not be allowed to fall into the water or be deposited on the shoreline. Dispose of construction debris in conformance with BASIC SITE MATERIALS AND METHODS Section.

B. Reinforced Concrete Members:

1. The extent of concrete removal at a location shall be as required to remove deteriorated concrete and to expose corroded reinforcing bars beyond the limits of corrosion.

2. Concrete Removal at Corroded Main Reinforcing Bars:

   a. Concrete shall be removed around corroded main reinforcing bars. The minimum clearance between the reinforcing bars and the concrete shall be 1 inch. The shape of the prepared defect shall be such that feathered-out edges are avoided and the repair material shall be “keyed-in” to the repair area.

   b. Concrete removal along the main reinforcing bars shall continue beyond the limit of loose corrosion products along a length of bar equal to a minimum of 10 times the bar size. The 1-inch clearance shall be maintained between the reinforcing bar and the concrete along the full length of the reinforcing bars, including the end sections free from corrosion.

   c. If stirrups or ties are exposed in the process of removing concrete, remove concrete at the stirrups and ties as specified in Paragraph B.3 of this Article.

3. Concrete Removal at Corroded Stirrups or Ties:

   a. Removal of concrete at corroded stirrups and ties shall be done to the back of the stirrups and ties only.

4. Removal of Corroded Conduits and Corroded Steel Other Than Reinforcing Bars:

    a. Unused, corroded conduits and corroded steel other than reinforcing bars may be present in some areas that are scheduled for repair. When such conduits or other steel are encountered, conduits or other steel shall be removed to a point where conduits or other steel do not interfere with the repair placement. Removed conduit or other steel sections shall be disposed of in conformance with BASIC SITE MATERIALS AND METHODS Section.

5. Bending-out of the reinforcing bars to provide clearance shall not be permitted and shall be considered as damage inflicted to the structure.

3.2 CLEANING OF CORRODED STEEL REINFORCING BARS AND STIRRUPS

A. Exposed reinforcing bars and stirrups shall be cleaned of corrosion products to a level of cleaning with silica sand conforming to SSPC-SP 6.

1. Perform abrasive blasting in conformance with REGULATORY REQUIREMENTS Section and SCAQMD Rules.

3.3 ADDITION AND REPLACEMENT OF REINFORCING BARS

A. Criteria:

1. Corroded portions of the main reinforcing bars with a loss in original diameter equal to or more than 30 percent require the placement of additional bars or replacement of corroded bars with new reinforcing bars. Contractor shall measure the remaining width and depth of the reinforcing bars by caliper after cleaning bars as specified in Cleaning of Corroded Steel Reinforcing Bars and Stirrups Article of this Section. The cross sectional area shall be based on the least value of 3 measurements taken along the length of the corroded bar. The locations for measurement shall be at the areas that exhibit the most extensive loss of section. The measurement results shall be reported to Engineer who shall make a determination on the necessity, extent, and method of providing additional reinforcement at the specific location.

2. Corroded stirrups shall not require additional or replacement reinforcing bars. Broken stirrups may be cut or bent back to their original position with the prior approval of Engineer. Stirrups shall be cleaned as specified in Cleaning of Corroded Steel Reinforcing Bars and Stirrups Article of this Section.

3. New reinforcing bars shall not contain rust, scale, oil, grease, clay, or other foreign substances that could reduce or destroy the bond. Minor rusting of uncoated reinforcement shall not be a basis of rejection, provided rusting has not reduced the effective cross sectional area of the reinforcement below the minimum standard diameter allowed by the applicable reinforcement standard, and that rust has been removed prior to placing the reinforcing bar.

B. Addition of Reinforcing Bars:

1. The corroded reinforcing bars to be lap spliced shall not be cut. New reinforcing bars of equivalent area shall be provided alongside of the corroded reinforcing bar and lapped as shown on Drawings. Lap lengths are based on a 50 percent loss of cross sectional area for corroded reinforcing bars.

2. Addition of the new reinforcing bars shall be in conformance with the following requirements:

a. The remaining existing corroded reinforcing bars shall be cleaned in conformance with the requirements of Cleaning of Corroded Steel Reinforcing Bars and Stirrups Article of this Section.

b. The new reinforcing steel shall be placed in a manner that shall allow unobstructed placement of the repair material.

c. The new reinforcing bars shall be secured or tied to prevent sagging beyond the plane of existing reinforcement.

C. Replacement of Reinforcing Bars:

1. If compliance with requirements of Addition of Reinforcing Bars Paragraph of Addition and Replacement of Reinforcing Bars Article of this Section cannot be ensured, remove and replace the corroded reinforcing bar. A typical reinforcing bar replacement shall be performed using the lap splice detail shown on Drawings of this Section. The splices of 2 adjacent reinforcing bars shall be staggered as much as possible, without the removal of additional sound concrete. Lap lengths shown in the table of Figure GRR-4 are based on a 50 percent loss of cross sectional area for corroded reinforcing bars.

2. Where lap splicing is not practical due to space restrictions or other practical considerations, as determined by Engineer, the replacement steel may be installed by welding to the splice as shown in Figure GRR-5.

Welding of the reinforcing steel shall conform to AWS D1.4 and can only be performed with the prior approval of Engineer. Filler material for welding the new reinforcing bars shall be based on bars having yield strength of 60,000 psi.

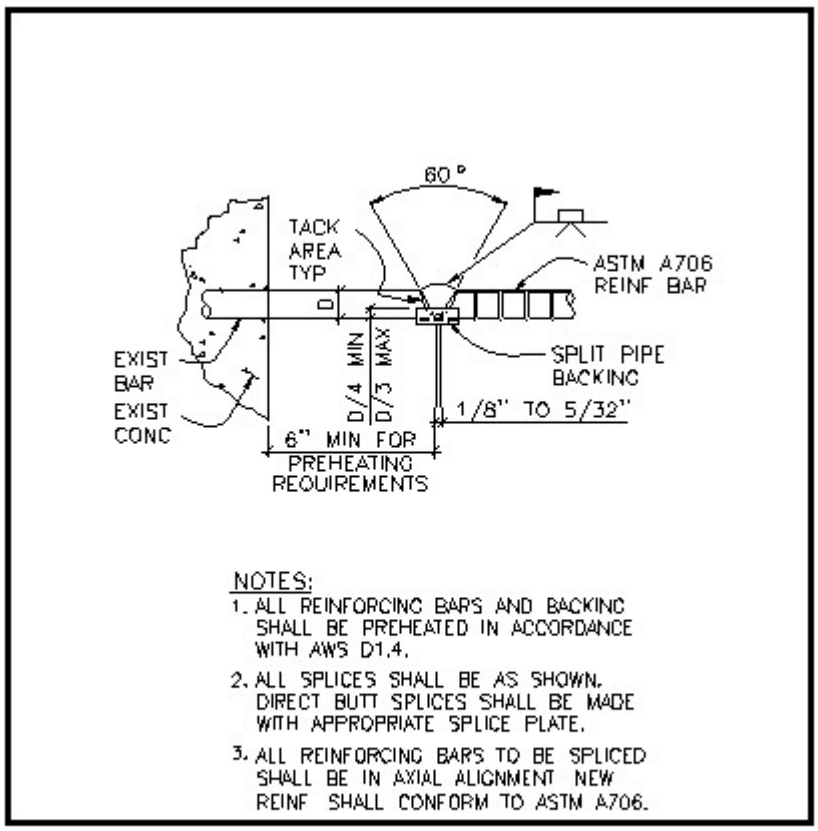


FIGURE GRR-5: WELDED SPLICING DETAIL FOR REPLACEMENT OF EXISTING STEEL

3. Cutting of existing reinforcing bars and splice arrangement, unless specifically called for in this Section, requires the prior approval of Engineer.

D. Addition or Replacement of Reinforcing Using Dowels:

1. In cases where insufficient length of existing reinforcement remains to be lap spliced, such as where horizontal reinforcing enters an adjoining member, dowels shall be used to achieve adequate development of the additional or replacement steel..

2. Provide adhesive anchors and rebar dowels as specified in Materials Article of this Section.

3. Adhesive anchors and rebar dowels shall be installed in conformance with manufacturer's written instructions.

4. Holes shall be drilled using a pneumatic, rock drill with an American National Standards Institute (ANSI)-compliant drill bit to ensure the proper hole dimension tolerances. No core drilling shall be permitted.

5. Avoid damaging or cutting the existing reinforcing bars.

6. If the proposed hole locations interfere with the existing rebar, contact Engineer prior to drilling.

7. Coordinate with Engineer for inspection during the addition or replacement of reinforcement using dowels.

E. Reinforcing Couplers:

1. In lieu of lapping reinforcing bars, reinforcing couplers may be used provided couplers develop at least 125 percent of the specified yield strength of the bar and have a current ICC ES report and Los Angeles Research Report Number. Bar Splice Products, Inc., Zap Screwlok System.

3.4 SLURRY PLACEMENT

A. Cement slurry fill shall be placed in a uniform manner that shall prevent voids in, or segregation of, the backfill.

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Inspection of Prepared Surfaces:

a. After the completion of the full sequence of surface preparation procedures as specified for each method of repair, the repair location shall be inspected and approved by Engineer prior to the placement of repair material. Any condition, which may interfere with the execution of Work in conformance with Specifications, shall be reported to Engineer.

2. Coring Samples:

    a. Core samples to verify the quality of shotcrete and cast-in-place concrete may be required at times and locations as designated by Engineer. Contractor shall be responsible for providing the necessary equipment and for execution of coring operations in conformance with ASTM C42.

    b. Coring shall be through the repair and extend into the existing concrete a minimum of 2 inches. Core diameter shall be 3 inches or as requested by Engineer.

    c. Cores shall be visually inspected by Engineer for the quality of bonding and any additional testing requirements shall then be determined.

    d. Fill the core holes with materials as specified in Materials Article of this Section and finish the surface to blend with adjacent concrete.

3. Reinforcing Bar Welding:

    a. Welding of steel reinforcing shall be performed by a certified welder in conformance with REINFORCING WELDING Section.

    b. Defective welding shall be either partially or completely removed and repaired as determined by Engineer. The cost for repair of defective welds shall be borne by Contractor.

4. Final Inspection of Repaired Area:

    a. After the completion of the repair, the repair location shall be inspected and approved by Engineer for final payment.

3.6 CLEANING

A. Construction and demolition debris shall be disposed of in conformance with BASIC SITE MATERIALS AND METHODS Section in a manner that complies with applicable laws and regulations.

B. Leave finished Work and Work area in a neat, clean condition without evidence of spillages onto adjacent areas or into the water. Repair materials and equipment may not be left on the structure without prior approval by the tenant.

C. Procedures for clean up or removal of excess repair material shall be in conformance with manufacturer's written instructions.

D. During the progress of Work, should Contractor lose, dump, throw overboard, sink, or misplace any material into the water, the material shall be recovered and removed at no additional cost to Department.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Repairing areas of deteriorated concrete by trowel (hand-applied mortar).

1.2 RELATED SECTIONS

A. Section 03 01 31 - General Concrete Repair Requirements

B. Section 03 37 14 - Shotcrete Repairs

C. Section 03 62 00 - Nonshrink Concrete Mortar

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 bid item of Bid Proposal Line Items.

2. Payment shall be made on the basis of the in-place volume (cubic feet) of the trowel repair material. The volume of trowel repair at each repair location, to be used for payment purposes, shall be the volume recorded in conformance with GENERAL CONCRETE REPAIR REQUIREMENTS Section.

1.4 REFERENCES

A. ASTM C1583 - Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method).

1.5 SUBMITTALS

A. Submit to Engineer for review, a description of equipment to be used prior to starting Work.

B. Material sampling and testing as specified in Field Quality Control Article in this Section.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Trowel repairs shall be performed using cement-based polymer modified mortar that can be applied by hand, using small tools (trowel) or by low pressure spray. The repair material shall be suitable for vertical and overhead applications.

B. Use of materials or products other than those specified shall require the prior approval of Engineer.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Prepare exposed reinforcing bars, stirrups, and other embedded steel components in conformance with GENERAL CONCRETE REPAIR REQUIREMENTS Section.

B. Perform abrasive blasting in conformance with GENERAL CONCRETE REPAIR REQUIREMENTS Section.

C. Surface preparation of defects to be repaired by hand-applied polymer-modified cementitious mortars shall be performed in conformance with the manufacturer’s written instructions.

3.2 CONCRETE REMOVAL

A. The extent of concrete removal shall conform to GENERAL CONCRETE REPAIR REQUIREMENTS Section.

3.3 ADDITIONS AND REPLACEMENT OF REINFORCING BARS

A. Additions and replacement of reinforcing bars shall conform to GENERAL CONCRETE REPAIR REQUIREMENTS Section.

3.4 PLACEMENT

A. Placement of repair material shall commence only after the prepared repair locations have been inspected and approved by Engineer in conformance with GENERAL CONCRETE REPAIR REQUIREMENTS Section, and “As-Repaired” dimensions have been recorded as described in GENERAL CONCRETE REPAIR REQUIREMENTS Section.

B. Apply repair materials for defects to be repaired with trowel-applied mortar in conformance with the manufacturer’s latest data sheet and written instructions.

C. Prior to start of specific repair and application, call for inspection by the manufacturer or manufacturer’s representative.

D. The depth of the trowel-applied mortar shall be such that the finished surface is level with the adjacent existing concrete. The objective of the patch shall be to provide cover of at least 1 1/2 inches. However, this may not always be possible due to insufficient cover provided during the original construction. Prior to application of trowel-applied mortar, report to Engineer any condition which may result in less than 1-inch cover. Engineer may call for building up the patch material in these areas depending upon aesthetics, tripping hazards, or other considerations.

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Material Sampling and Testing:

a. Project pretest repair materials for adhesion prior to actual application of each specific type of repair. Notify Engineer if adhesion failure occurs, prior to continuing with the repair Work.

b. During the application of polymer mortar or concrete, submit to Engineer a 2-inch by 4-inch specimen cylinder prepared every 50 square feet of repair, but not less than 3 cylinders per batch, for testing, to ensure proper mixing, consistency, and setting time.

c. Testing shall be American Society for Testing and Materials (ASTM International) methods listed in the material manufacturer’s specifications.

d. Field Quality Performance Requirements:

1) Engineer shall evaluate bonding to existing concrete after the repair material has cured.

2) The evaluation shall be performed by sounding, such as tapping with a blunt metal instrument.

3) Detection of a hollow sound in any area shall be reason to suspect inadequate bonding. Core each such area in conformance with GENERAL CONCRETE REPAIR REQUIREMENTS Section, where required by Engineer, to determine bonding adequacy.

2. Perform a bond strength test in conformance with ASTM C1583.

3. Engineer shall perform the following tests and inspections, as specified in GENERAL CONCRETE REPAIR REQUIREMENTS Section, as applicable:

a. Inspection of the repaired area.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cast-in-place anchor bolts, anchor rods, reinforcing anchorage adhesive, and post-installed concrete anchors

B. Design of concrete anchors not indicated on Drawings including but not limited to, installation of anchors into concrete for the following structural and nonstructural components:

1. Structural members and accessories
2. Metal, wood, and plastic fabrications
3. Architectural components
4. Mechanical and electrical equipment and components
5. Plumbing, piping, and HVAC Work
6. Other components requiring attachment to concrete

1.2 RELATED SECTIONS

A. Section 03 20 00 - Concrete Reinforcing

B. Section 09 96 00 - High-Performance 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 the Lump Sum Construction bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ACI 355.4 - Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary.

B. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary.

C. ACI CODE-355.2 - Post-Installed Mechanical Anchors in Concrete—Qualification Requirements and Commentary.

D. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges.

E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

F. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.

G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

H. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

I. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

J. ASTM A536 - Standard Specification for Ductile Iron Castings.

K. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric).

L. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

M. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

N. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

O. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions.

P. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

Q. ASTM F594 - Standard Specification for Stainless Steel Nuts.

R. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

S. ASTM F2329/F2329M - Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.

T. ICC (IBC) - International Building Code.

U. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements.

V. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements.

1.5 DEFINITIONS

A. Adhesive Anchors:

1. Post-installed anchors developing their strength primarily from chemical bond between concrete and anchor.

2. Includes anchors using acrylics, epoxy, and other similar adhesives.

B. Anchor Bolt: Any cast-in-place anchorage that is made of a headed (i.e. bolt) material.

C. Anchor Rod: Any cast-in-place or post-installed anchorage made from unheaded, threaded, rod, or deformed bar material.

D. Concrete Anchor: Generic term for either an anchor bolt or an anchor rod.

E. Galvanizing: Hot-dip galvanizing per ASTM A123/A123M, ASTM A153/A153M, or ASTM F2329/F2329M with minimum coating of 2.0 ounces of zinc per square foot of metal (average of specimens) unless noted otherwise or dictated by standard.

F. Hardware: As defined in ASTM A153/A153M

G. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at Project Site.

2. Installer and applicator are synonymous.

H. Mechanical Anchors:

1. Post-installed anchors developing their strength from attachment other than through adhesives or chemical bond to concrete.

2. Includes expansion anchors, expansion sleeve, screw anchors, undercut anchors, specialty inserts, and other similar types of anchorages.

3. Drop-in anchors and other similar non-ICC ES approved anchors are not allowed.

I. Post-Installed Anchor: Any adhesive or mechanical anchor installed into previously placed and adequately cured concrete.

J. Bollards: As defined in ASTM A536 Grade 65-45-12

1.6 SUBMITTALS

A. Shop Drawings:

1. Product technical data including:

a. Acknowledgement that submitted products meet requirements of referenced standards.

b. Manufacturer material data sheet for each anchor.

1) Clearly indicate which products on the data sheet are proposed for use on Project.

c. Manufacturer’s written instructions.

d. Current ICC-ES report for each post-installed anchor system indicating the following:

1) Certification that anchors meet requirements indicated in this Specification.

2) Performance data showing that anchor is approved for use in cracked concrete.

3) Seismic design categories for which the anchor system has been approved.

4) Required installation procedures.

5) Special inspection requirements for installation.

e. Contractor-Designed Anchors:

1) Show diameter and embedment depth of each anchor.

2) Indicate compliance with ACI CODE-318, Chapter 17

3) Design tension and shear loads used for anchor design.

4) Engineering design calculations:

a) Indicate design load to each anchor.

b) Develop anchor forces based on design criteria listed herein and/or the manufacturer's design information.

c) Sealed and signed by Contractor's professional structural engineer.

d) Calculations shall be submitted for information purposes only.

5) Provide torque values where pipe sleeves anchors are used.

f. Anchorage layout drawings and details:

1) Indicate anchor diameter, embedment, length, anchor type, material, and finish.

2) Drawings showing location, configuration, spacing, and edge distance.

3) Type of post-installed anchor system used.

a) Provide manufacturer's ICC-ES report for the following:

1 Mechanical anchorage per ICC-ES AC193

2 Adhesive anchorage per ICC-ES AC308

B. Samples:

1. Representative samples of concrete anchors may be requested by Engineer. Review shall be for type and finish only. Compliance with other requirements is exclusively the responsibility of Contractor.

C. Informational Submittals:

1. Certification of qualifications for each installer of post-installed anchors.

a. Indicate successful completion or certification for each type of approved post-installed anchor as required by Contract Documents.

b. Provide one of the following for each type of anchor, as required by this Section:

1) Letter from the manufacturer documenting successful training completion.

2) Certification of completion for Engineer-approved program.

1.7 QUALITY ASSURANCE

A. Qualifications:

1. Anchor designer for Contractor-designed post-installed anchors and cast-in-place anchorage shall be a Professional Civil Engineer licensed in the State of California.

2. Installer for post-installed anchors shall be trained by the manufacturer or certified by a training program approved by Engineer.

B. Post-installed anchors and related materials shall be listed by ICC-ES.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project Site in manufacturer’s or distributor’s packaging undamaged and complete with installation instructions.

B. Store above ground on skids or other supports to keep items free of dirt and other foreign debris and to protect against corrosion.

C. Protect and handle materials in conformance with the manufacturer’s written instructions to prevent damage or deterioration.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cast-in-Place Concrete Anchors:

1. Building and nonbuilding structures, unless otherwise specified:

a. ASTM F1554, Grade 36 or Grade 55 with weldability supplement S1 for galvanized threaded rods.

b. ASTM A307, Grade A for galvanized headed bolts.

c. For submerged or used in enclosed tankage, ASTM F5933, Type 316.

2. Other cast-in-place concrete anchors for equipment:

a. Stainless steel with matching nut and washer.

b. Submerged application: ASTM F593, Type 316.

c. Non-submerged application: ASTM F593, Type 304 or Type 316 anchors and washers.

d. Nuts for non-submerged applications, ASTM A563/A563M and coated after torqued.

B. Post-Installed Mechanical and Adhesive Concrete Anchors:

1. Stainless steel with matching nut and washer.

2. Submerged application: ASTM F593, Type 316.

3. Non-submerged application: ASTM F593, Type 304 or Type 316, with ASTM A563/A563M nuts coated after torquing.

C. Reinforcement: See CONCRETE REINFORCING Section

D. Headed Studs: ASTM A108 with a minimum yield strength of 50,000 pounds per square inch (psi) and a minimum tensile strength of 60,000 psi.

E. Deformed Bar Anchors: ASTM A1064/A1064M with minimum yield strength of 70,000 psi and a minimum tensile strength of 80,000 psi.

F. ASTM F1554 GR105 thru bolts

G. Washers:

1. ASTM F436/F436M unless noted otherwise, finish to match bolt.

2. If stainless steel anchorage is being used for cast-in-place anchorage, furnish washers of the same material and alloy as in the accompanying anchorage.

3. Plate washers: Minimum 1/2 inch thick fabricated ASTM A36/A36M square plates as specified or required.

4. Follow manufacturer’s written instructions for post-installed anchorage.

H. Nuts:

1. ASTM A563/A563M for cast-in-place anchorage.

2. If stainless steel anchorage is being used for cast-in-place anchorage in submerged or enclosed tankage, nuts shall meet ASTM F594 and be the matching material and alloy as in the accompanying anchorage.

3. Follow manufacturer’s written instructions if using post-installed anchorage.

I. Galvanizing Repair Paint:

1. High zinc dust content paint for regalvanizing welds and abrasions.

2. ASTM A780/A780M

3. Zinc content: Minimum 92 percent in dry film.

4. ZRC Cold Galvanizing Compound as manufactured by ZRC Worldwide or High Performance Zinc Spray as manufactured by Clearco Products Co., Inc.

J. Dissimilar Materials Protection: See HIGH-PERFORMANCE COATINGS Section

2.2 CONTRACTOR-DESIGNED ANCHORAGE

A. Manufacturers:

1. Post-installed anchor systems for the listed manufacturers shall be considered only if a current ICC-ES evaluation report is submitted in conformance with Submittals Article of this Section and if the anchor system is approved by Engineer.

a. Hilti.

b. Dewalt.

c. Simpson Strong-Tie.

B. Design the anchorage when any of the following occur:

1. Design load for concrete anchorage is shown on Drawings.

2. When specifically required by Contract Documents.

3. When an anchorage is required but not specified in Drawings.

C. Anchorage Design Loads:

1. Determine the design loads, including wind and seismic loads, per ICC (IBC). Incorporate static and dynamic loading forces established by the equipment manufacturer, where required for equipment.

a. Anchorage of equipment and non-structural components: Use the actual dead and operating loads provided by the manufacturer.

D. When Contract Drawings indicate an anchor diameter or length, design shall incorporate these as “minimums.” Design these anchors and provide necessary documentation as required herein.

E. Cast-in-Place Concrete Anchors:

1. Provide the material, nominal diameter, embedment length, spacing, edge distance and design capacity to resist the calculated load based on the requirements given in ICC (IBC) including ACI CODE-318, Chapter 17

2. Design assuming cracked concrete.

F. Post-Installed Concrete Anchors:

1. Provide the manufacturer’s system name/type, nominal diameter, embedment depth, spacing, minimum edge distance, cover, and design capacity to resist the calculated load based on requirements given in ICC (IBC), ACI CODE-318, Chapter 17 and current ICC-ES report, for the anchor to be used.

2. Design assuming cracked concrete.

2.3 ENGINEER-DESIGNED ANCHORAGE

A. When the size, length and details of anchorages are shown on Contract Drawings, Contractor design of anchorage is not required.

B. Manufacturers:

1. Additional newer post-installed anchor systems for the listed manufacturers shall be considered only if a current evaluation agency report is submitted in conformance with Submittals Article of this Section, the anchor system is certified by ICC-ES for cracked concrete conditions, and if approved by Engineer.

2. Mechanical Anchors:

a. Hilti:

1) Kwik Bolt TZ2 (ICC-ES ESR-4266)

b. Substitution request to indicate the proposed anchor has at least the same tension and shear strength as the specified anchor installed as indicated in Contract Drawings.

c. Calculations to be stamped by a Professional Engineer registered in the State of California.

3. Adhesive Concrete Anchors shall be ASTM C881/C881M Compliant:

a. Hilti:

1) HIT-RE 500 V3 (ICC ESR-3814)

b. Substitution request to indicate the proposed anchor has at least the same tension and shear strength as the specified anchor installed as indicated in Contract Drawings.

c. Calculations to be stamped by a Professional Engineer registered in the State of California.

4. Concrete Screw Anchors:

a. Hilti:

1) Kwik HUS-EZ Screw (ICC-ES ESR-3027)

b. Substitution request to indicate the proposed anchor has at least the same tension and shear strength as the specified anchor installed as indicated in Contract Drawings.

c. Calculations to be stamped by a Professional Engineer registered in the State of California.

PART 3 - EXECUTION

3.1 GENERAL

A. Cast-in-Place Anchorage:

1. Use where anchor rods or bolts are indicated on Drawings, unless another anchor type is approved by Engineer.

2. Provide concrete anchorage as shown on Drawings or as required to secure components to concrete.

B. Adhesive Anchorage:

1. Use only where specifically indicated on Drawings or when approved for use by Engineer.

2. May be used where subjected to vibration or where buried or submerged.

3. Do not use in overhead applications or sustained tension loading conditions such as utility hangers.

4. Contact Engineer for approval when anchors shall not be installed in compliance with manufacturer's written instructions.

C. Mechanical Anchorage:

1. Use only where specifically indicated on Drawings or when approved for use by Engineer.

2. Do not use where subjected to vibration.

3. May be used in overhead applications.

4. Contact Engineer for clarification when anchors shall not be installed in compliance with the manufacturer's written instructions.

D. Do not use powder-actuated fasteners and other types of bolts and fasteners not specified herein for structural applications unless approved by Engineer or specified in Contract Documents.

3.2 PREPARATION

A. Provide adequate time to allow for proper installation and inspection prior to placing concrete for cast-in-place concrete anchorage.

B. Prior to installation, inspect and verify areas and conditions under which concrete anchorage is to be installed.

1. Notify Engineer of conditions detrimental to proper and timely completion of Work.

2. Do not proceed with Work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.

C. Special Inspection is required in conformance with ICC (IBC) for concrete anchorage.

1. Notify the special inspector that an inspection is required prior to concrete placement (or during post-installed anchorage installation).

2. See Field Quality Control Article of this Section for additional requirements.

D. Post-installed anchor manufacturer's representative shall demonstrate and observe the proper installation procedures for the post-installed anchors at no additional expense to Department.

1. Follow such procedures to ensure acceptable installation.

2. Adhesive anchors shall be installed in concrete aged a minimum of 21 days.

3.3 INSTALLATION

A. Tie cast-in-place anchorage in position to embedded reinforcing steel using wire.

1. Tack welding of anchorage is prohibited.

2. Chase threads as required and coat the projected portion of carbon steel anchors and nut threads with a heavy coat of clean grease after concrete has cured.

3. Anchorage location tolerance shall be in conformance with AISC 303.

4. Provide steel or durable wood templates for column and equipment anchorage.

a. Templates to be placed above top of concrete and not impede proper concrete placement and consolidation.

B. Unless noted or specified otherwise:

1. Connect aluminum and steel members to concrete and masonry using stainless- steel cast-in-place anchorage unless shown otherwise.

a. Provide dissimilar materials protection per HIGH-PERFORMANCE COATINGS Section.

2. Provide washers for anchorage.

3. Where exposed, extend threaded anchorage a maximum of 3/4 inches above the top of the fully engaged nut.

a. If anchorage is cut off to the required maximum height, threads shall be dressed to allow nuts to be removed without damage to the nuts.

C. Do the following after nuts are snug-tightened down:

1. If using post-installed anchorage, follow manufacturer's written instructions.

2. Upset threads of anchorage to prevent nuts from backing off.

a. Provide double nut or lock nut in lieu of upset threads for items that may require removal in the future.

3. For other cast-in-place anchorage material, tighten nuts down an additional 1/8 turn beyond snug tight to prevent nuts from backing off.

4. If 2 nuts are used per concrete anchor above the base plate, tighten the top nut an additional 1/8 turn to lock the 2 nuts together.

5. If using post-installed anchorage, follow manufacturer's written instructions.

D. Protect embedded items from damage and are not filled in with concrete.

E. Secure architectural components such that it shall not be aesthetically distorted and fasteners shall not be overstressed from expansion, contraction, or installation.

F. Coat aluminum surfaces in contact with dissimilar materials in conformance with HIGH-PERFORMANCE COATINGS Section.

G. Repair damaged galvanized surfaces in conformance with ASTM A780/A780M.

1. Prepare damaged surfaces by abrasive blasting or power sanding.

2. Apply galvanizing repair paint to minimum 6 mils DFT in conformance with the manufacturer's written instructions and ASTM A780/A780M.

H. For post-installed anchors, comply with manufacturer's written instructions on the hole diameter and depth required to fully develop the tensile strength of the anchor or reinforcing bar.

1. Use hammer drills to create holes.

2. Properly clean out the hole per the ICC-ES reports utilizing a non-metallic fiber bristle brush and compressed air or as otherwise required to remove loose material from the hole prior to installing the anchor in the presence of the Special Inspector.

3.4 FIELD QUALITY CONTROL

A. Field Tests and Inspections:

1. Department reserves the right to inspect and test completed anchorage at a minimum of 10 percent (for large quantity) to 25 percent (smaller quantity) to 100 percent (very small project quantity).

2. Such testing shall conform to requirements of ACI CODE-355.2 and/or ACI 355.4 as applicable.

3. Failed anchors shall be satisfactorily replaced at no additional cost to Department.

3.5 CLEANING

A. After concrete has been placed, remove protection, and clean anchorage of concrete, dirt, and other foreign matter.

B. Provide surface acceptable to receive field applied paint coatings.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel for the following:

1. Cast-in-place concrete repairs
2. Concrete wharf construction
3. Marine bollards
    a. Supports and accessories for steel reinforcement.

1.2 RELATED SECTIONS

A. Section 35 54 00 - Concrete Wharf Construction

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Concrete Reinforcing measured and paid by the pound. Includes furnishing transportation, labor, materials, and equipment to add or replace reinforcement. Bar length measurements and calculations shall be reviewed and approved by Engineer for payment purposes. Payment shall be made under the Lump Sum Construction bid item of Bid Proposal Line Items. No payment shall be made for lengths that have not been reviewed and approved by Engineer.
2. Payment for concrete reinforcement for the installation of marine bollards shall be made under the Lump Sum Construction bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ACI SPEC-301 - Specifications for Concrete Construction.

B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

C. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.

D. CRSI (DA4) - Manual of Standard Practice.

1.5 SUBMITTALS

A. Manufacturer's Certificate: Certify that reinforcing steel supplied for this Project meet or exceed specified ASTM requirements.

1. Reports: Submit 2 certified copies of mill test report of reinforcement materials analysis.

B. Refer to GENERAL CONCRETE REPAIR REQUIREMENTS Section for additional submittal requirements

1.6 QUALITY ASSURANCE

A. Perform Work of this section in conformance with ACI SPEC-301.

1. Maintain 1 copy of each document on Project Site.

PART 2 - PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

1. Deformed billet-steel bars.

2. Unfinished.

B. Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars.

1. Unfinished.

C. Stirrup Steel: ASTM A706/A706M, steel wire, unfinished.

D. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

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. In lieu of lapping reinforcing bars, reinforcing couplers may be used provided couplers develop at least 125 percent of the specified yield strength of the bar and have a current ICC ES report and Los Angeles Research Report Number.

1. Products:

    a. Dayton Superior Corporation; Bar Lock Coupler System: www.daytonsuperior.com.

B. Grout: Cementitious, non-metallic, non-shrink grout for use with manufacturer's grout sleeve reinforcing bar coupler system.

1. Products:

    a. Dayton Superior Corporation; Sleeve-Lock Grout: www.daytonsuperior.com.

2.3 FABRICATION

A. Fabricate concrete reinforcing in conformance with CRSI (DA4).

B. 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

1. Place, support, and secure reinforcement against displacement. Do not deviate from required position.

B. Accommodate placement of formed openings.

1. Maintain concrete cover around reinforcing as follows:

2. Beams: 3 inches

3. Deck Soffit: 3 inches

4. Bulkhead (exposed to weather): 3 inches

5. Pipe Support Structure Soffit: 3 inches

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Engineer shall perform the following tests and inspections, as specified in GENERAL CONCRETE REPAIR REQUIREMENTS Section, as applicable:

a. Inspection of prepared surface.

b. Inspection of the repaired area.

c. Core samples as directed by Engineer.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Weld reinforcing bars

1.2 RELATED SECTIONS

A. Section 35 54 00 - Concrete Wharf Construction

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 that requires reinforcement welding.

1.4 REFERENCES

A. ASTM E165/E165M - Standard Practice for Liquid Penetrant Testing for General Industry.

B. ASTM E709 - Standard Guide for Magnetic Particle Testing.

C. AWS D1.1/D1.1M - Structural Welding Code - Steel.

D. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars.

1.5 SUBMITTALS

A. Submit welding procedures for review approval by Engineer prior to the start of welding. Only approved procedures shall be used. For weld procedure qualification, refer to Quality Assurance Article of this Section. Include the following information:

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.

B. Submit repair procedure for review of Engineer prior to such operation.

C. Submit record of the test results and certificates of qualification of personnel to Engineer prior to start of Work.

D. 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 D of AWS D1.1/D1.1M may be used.

1.6 QUALITY ASSURANCE

A. Welders, welding operators, and tackers shall be qualified by test as prescribed in AWS D1.1/D1.1M and shall be City of Los Angeles Department of Building and Safety certified.

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.

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. Electrodes of welding of reinforcing bars shall conform to the requirements of AWS D1.4/D1.4M.

PART 3 - EXECUTION

3.1 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.

3.2 WELDING PROCEDURES

A. Welding shall be in conformance with AWS D1.1/D1.1M, AWS D1.4/D1.4M , and this Section.

B. Prior to commencing production welding, Contractor shall establish detailed welding procedure for welding reinforcing in accordance with welding details on Drawings and in conformance with the applicable requirements of AWS D1.1/D1.1M and AWS 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. Contractor shall provide for the necessary supervision to ensure strict adherence to the procedure. Appropriate forms in Appendix A of AWS D1.4/D1.4M may be used.

3.3 DETAILS OF WELDED JOINTS

A. Reinforcing Welds:

1. Reinforcing welds shall be detailed in conformance with AWS D1.4/D1.4M.

2. 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.

3. Arc Strikes:

a. There shall be no arc strikes on the base material outside the weld groove or heat effect zone.

3.4 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 AWS D1.4/D1.4M.

B. 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.

3.5 WEATHER PROTECTION

A. Contractor shall establish sufficient shielding to protect each welding site from rain, sand, and wind.

3.6 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 labeled with the information from the supply container.

3.7 RUST AND SCALE REMOVAL

A. Rust and scale on surface adjacent to joints to be welded shall be thoroughly removed to expose clean steel within 2 inches of the joint.

3.8 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.

2. Procedure, standards, and acceptance criteria are listed in Table 1 at the end of this Section.

3. Percentages of tests in welds are shown in Table 2 at the end of this Section.

4. Percentage of length of weld tested in a given type of connection shall be as shown in Table 2. Location of the spot testing shall be determined by Engineer.

5. 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 additional cost to Department.

6. Contractor shall be solely responsible for the cost of testing, repairing or replacing, and retesting welds found to be defective.

7. Depending on the results of non-destructive examination called for above, the percentage of welding inspection may be adjusted accordingly by Engineer.

8. 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.

3.9 CORRECTIONS AND REPAIRS

A. When inspection or testing 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 D1.4/D1.4M.

B. Test the repaired weld for soundness. The method of testing, depending on the type of weld shall be as specified in this Section.

C. Engineer shall reject any weld under the following conditions:

1. Welds do not conform to AWS D1.4/D1.4M and this Section.

2. Welds do not conform to Drawings.

3. Weld impairs the safety of the member or structure.

Testing	Procedures and Standards	Acceptance Criteria
Visual Inspection	To comply with Drawings and the requirements of AWS D1.1/D1.1M and AWS D1.4/D1.4M	AWS D1.1/D1.1M Section 8.15.1
Magnetic Particle Test (1)	Test method in conformance with ASTM E709	AWS D1.1/D1.1M Section 8.15.1
Liquid Penetrant Test (1)	Test method in conformance with ASTM E165/E165M	AWS D1.1/D1.1M Section 8.15.1

Table 1: Weld Testing

(1) Either type of testing may be used.

Items	Members	Types of Weld	Visual Inspection	Magnetic Particle or Liquid Penetrant
1.	Location to be determined by Engineer	Reinforcing Welds	W-100% L-100%	W-100% L-100%

Table 2: Percentage of Test in Welds

Legend: W - Percentage of number of weld (Field Quality Control Article Paragraph B.3 of this Section).

L - Percentage of length of weld.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Shotcrete repairs

1.2 RELATED SECTIONS

A. Section 03 01 31 - General Concrete Repair Requirements

B. Section 03 21 30 - Reinforcing Welding

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 bid item of Bid Proposal Line Items.

2. Payment shall be paid on the basis of the calculated in-place volume (cubic feet) of the shotcrete repair material. The volume of shotcrete repair at each repair location, to be used for payment purposes, shall be the volume determined as follows: Contractor shall measure length, width and average depth dimensions, calculate and record, in the presence of Engineer, each defect's volume or length in the "As-Repaired" column of of concrete crack and spall repair summary sheets in the back of GENERAL CONCRETE REPAIR REQUIREMENTS Section, after demolition, preparation and acceptance of each defect and prior to starting repair. Quantities shall not exceed those listed in GENERAL CONCRETE REPAIR REQUIREMENTS Section without prior approval of Engineer. Volume and length measurements and calculations shall be reviewed and approved by Engineer for payment purposes. No payment shall be made for volumes or lengths that have not been reviewed and approved by Engineer.

3. The minimum shotcrete cover over the reinforcement bars shall be 3 inches, unless noted otherwise on Drawings. No payment shall be made for shotcrete cover exceeding 3 inches over the reinforcement bars or where shotcrete extends beyond 2 inches from the plane of the existing beam or deck, whichever measurement results in less volume.

4. Costs to be included in the unit price shall include surface preparation, cleaning the existing reinforcement, application of the shotcrete and necessary incidentals to complete shotcrete repairs and preconstruction testing.

5. Payment for providing new reinforcing bars in addition to, or to replace existing bars, shall include furnishing labor, materials, equipment, and incidentals to install the new bars using the splice details provided in GENERAL CONCRETE REPAIR REQUIREMENTS Section for the unit price per pound of installed replacement bar or per weld.

1.4 REFERENCES

A. ACI PRC-506 - Shotcrete-Guide.

B. ACI SPEC-506.2 - Specification for Shotcrete.

C. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

D. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

E. ASTM C1116/C1116M - Standard Specification for Fiber-Reinforced Concrete.

F. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning.

1.5 SUBMITTALS

A. Prior to starting Work, submit to Engineer for review the following information:

1. Name of independent testing laboratory to be hired and paid for by Contractor for approval by Engineer.

2. Method of shotcrete application, repair procedure, and data on the equipment to be used.

3. Proposed pre-packaged mortar characteristics, including supplier’s data sheets.

4. Results of the preconstruction testing.

B. Requirements as specified in GENERAL CONCRETE REPAIR REQUIREMENTS Section.

1.6 QUALITY ASSURANCE

A. Quality assurance shall conform to GENERAL CONCRETE REPAIR REQUIREMENTS Section.

B. Additional requirements for shotcrete repair shall be as follows:

1. Shotcrete applier shall be certified through a licensed testing laboratory, and shall have performed a minimum of 2 shotcrete applications during the last 3 years on projects of similar size and scope.

2. Preconstruction testing conforming to ACI SPEC-506.2 . Perform prior to execution of Work on the structure.

3. Construction testing is not specified, however, Engineer reserves the right to perform coring of the completed shotcrete Work in order to evaluate its quality.

C. Preconstruction Testing:

1. Preconstruction testing shall be performed on test panels conforming to the complete set of requirements described in Section 1.6.1 of ACI SPEC-506.2.

a. One complete series of preconstruction tests shall be sufficient for shotcrete Work under Contract provided test results are satisfactory and crew members do not change.

2. The test panels shall be prepared in the following shooting positions:

a. Front surface of pile caps or beams (marginal or intermediate).

b. Soffit surface of deck, pile cap, or beams (marginal or intermediate).

3. Prepare 2 sets of panels:

a. In each of the positions without reinforcement.

b. With No. 6 reinforcing steel installed at 1 inch from the panel’s back surface and with variable spacing of 2 to 4 inches between reinforcing bars.

4. The panels without reinforcement shall be a minimum of 5 inches thick and shall be large enough to yield 3 cores for compressive strength test and for water absorption test. These panels shall be shotcreted over the roughened concrete surface. Precast concrete plates of the necessary minimum size shall be either acquired or specially made.

5. The compressive strength of the non-reinforced test panels shall be determined from the average of 3 cores obtained from a test panel and shall not be less than 5,000 pounds per square inch (psi) at 7 days when tested in conformance with ASTM C42.

6. The reinforced panels shall be a minimum of 30-inches by 30-inches and shall have a total thickness of a minimum of 5 inches with a minimum of 3-inch cover over the reinforcement.

7. Cores from the reinforced panel (3 cores per panel) shall be evaluated visually by Engineer. Samples shall be visually inspected and graded using the following grading system. Grades 1 and 2 represent acceptable shotcrete; other shotcrete shall be rejected and shall be repaired at sole cost and expense of Contractor.

    a. Grade 1: Sample shall have good paste content throughout, without laminations, sandy areas, or large hollows. Air bubbles shall have a maximum dimension of 0.050 inch. Air bubbles shall be dispersed at random without interconnection. There shall be no sand pockets, hollows, or shadows behind crossed reinforcing bar sections. Surface of sample shot against the form shall be sound with a good paste face, without a sandy texture, voids, or hollows where sandy overspray has pulled away or stuck to the form.

    b. Grade 2: Sample shall have good paste content of dense material meeting the same standards as Grade 1 except there may be 1 or 2 small tight (that is, the sand shall be bonded sufficiently by cement paste that it cannot be easily raked out) laminations or sandy areas having a maximum dimension perpendicular to the faces of the sample of 1/8 inch, and parallel to the faces of the sample, a maximum dimension of 1 inch in width. Height, width, or depth of a void shall not exceed 3/8 inch. Tight shadowing or slightly porous areas, lean in paste, behind reinforcing steel shall not exceed 1/2 inch in any dimension except along the length of the reinforcing bar.

    c. Samples with greater imperfections than Grades 1 and 2 shall be rejected.

D. Use of material or products other than those specified shall require documented proof that proposed substitute product has a 3 year proven record of performance in the marine environment confirmed by actual field tests, and 5 successful installations that Engineer can verify.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials to prevent contamination, segregation, corrosion, and damage. Store liquid admixtures in order to prevent evaporation.

B. Other requirements as specified in GENERAL CONCRETE REPAIR REQUIREMENTS Section.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Requirements for reinforcing steel and components of shotcrete mix other than cement shall be in conformance with ACI SPEC-506.2.

B. Materials for filling of core holes shall be as specified in GENERAL CONCRETE REPAIR REQUIREMENTS Section.

C. Synthetic reinforcing fibers shall be in conformance with ASTM C1116/C1116M, Type III. Fibers shall be 100 percent virgin polypropylene fibrillated fibers containing no reprocessed olefin materials. Fibers shall have a specific gravity of 0.9, a minimum tensile strength of 70 kips per square inch (ksi), graded in conformance with manufacturer's written instructions, and specifically manufactured to an optimum gradation for use as secondary reinforcement for shotcrete. Use a minimum of 1-1/2 pounds and a maximum of 2 pounds of fibers per cubic yard of concrete. Toughness indices shall meet requirements for performance Level I.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

A. Basic operations for the installation of shotcrete shall be performed in full compliance with the detail descriptions and requirements contained in ACI PRC-506 and ACI SPEC-506.2.

3.2 CONCRETE REMOVAL

A. The extent of concrete removal shall conform to GENERAL CONCRETE REPAIR REQUIREMENTS Section.

3.3 ADDITION AND REPLACEMENT OF REINFORCING BARS

A. Addition and replacement of reinforcing bars shall conform to GENERAL CONCRETE REPAIR REQUIREMENTS and REINFORCING WELDING Sections.

3.4 SURFACE PREPARATION

A. Exposed reinforcing bars and other embedded steel components shall be cleaned of corrosion products to a SSPC-SP 6/NACE No.3 cleaning.

B. Other surface preparation requirements including sequencing, techniques, and procedures for abrasive blasting, cleaning, washing, prewetting, and the like shall be as described in ACI PRC-506, Section 5.2.

C. Dampen surface with fresh water; substrate shall be saturated surface dry with no standing water during application.

D. Necessary precautions shall be taken to prevent abrasive blasting contaminants from entering harbor waters during the repair and removal phase of Project. Confined blasting shall be performed where feasible. Confined blasting includes, but is not limited to, enclosing the material/area to be blasted with structures such as metal shrouds or canvas.

E. Shotcrete placement shall commence only after the prepared repair locations have been inspected and approved by Engineer.

3.5 SHOTCRETE PLACEMENT

A. Shotcrete placement procedures shall be as described in Chapter 8 of ACI PRC-506, the manufacturer’s latest data sheet and written instructions, and with the following additional requirements as detailed in this Section.

B. Prior to the start of specific repair and application, Contractor shall call for inspection by Engineer, manufacturer, or manufacturer’s representative.

C. Apply shotcrete no later than 4 hours after the completion of the surface preparation. If this requirement cannot be satisfied, perform additional cleaning at the same repair location prior to application of shotcrete. After additional cleaning, the condition of the reinforcing steel and concrete surfaces shall meet the requirements of Surface Preparation Article of this Section.

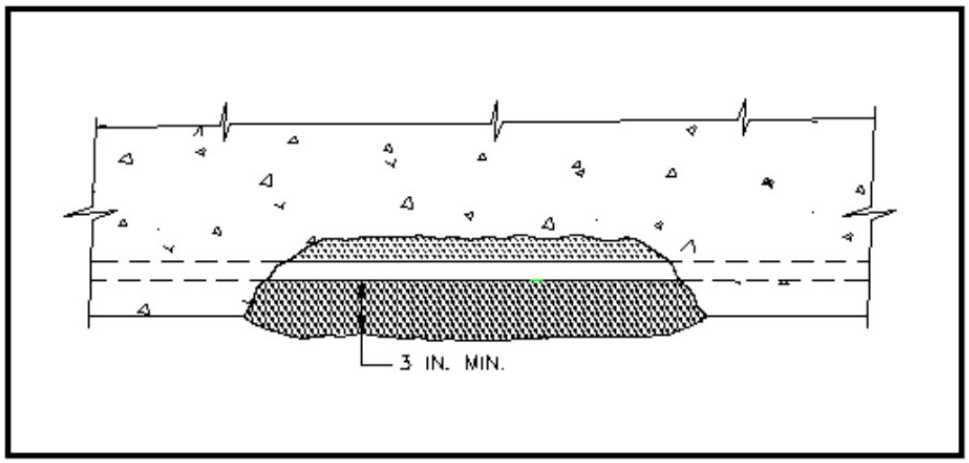


FIGURE SR-1: MINIMUM REQUIRED SHOTCRETE COVER OVER REINFORCEMENT

D. Reinforcement Cover: Unless otherwise indicated on Drawings, provide a minimum 3 inches of cover over reinforcement. This cover shall be ensured over the entire area of repair patch (only plus tolerances allowed) as shown in Figure SR-1 included in this Section.

E. Effort shall be made to complete the shotcrete build-up at specific locations without letting the lower layers harden completely. If this cannot be achieved, the succeeding layers may be placed over the hardened shotcrete. However, requirements for multiple layers described in Section 8.5.8 of ACI PRC-506 shall be strictly enforced. Inspection and approval by Engineer of the surface to receive the final layer of shotcrete is required.

F. The texture of the shotcrete surface may be as rough as the mix components and placement techniques allow. However, the general profile of the repair patch shall be sufficiently even to allow effective control of the thickness of the material in place. The out-of-line tolerances shall not exceed 1 inch for a 5-inch template set anywhere against the surface of the finished shotcrete, as shown in Figure SR-2 of this Section. These criteria for the degree of evenness of shotcrete in place shall not be extrapolated (e.g. 2-inch tolerance for 10-inch base).

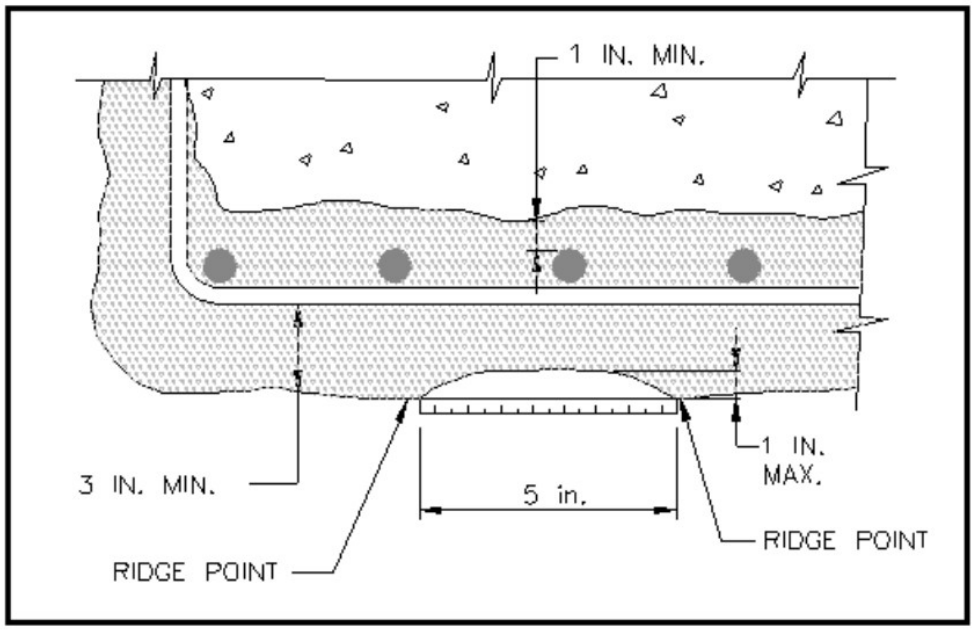


FIGURE SR-2: OUT-OF-LINE TOLERANCES FOR SHOTCRETE PLACEMENT

G. Remove shotcrete that lacks uniformity, contains secretion, honeycombing, laminations, dry patches, voids, sand pockets, sand lenses, sagging, or incomplete encasement of reinforcement.

H. For repairing large areas of the deck soffit, special considerations are required for layering and sequencing of material application. Contractor shall place the material in such a way as to minimize the shrinkage and forming of cracks after the material has hardened. Submit the repair procedure for the approval of Engineer as required by Submittals Article of this Section prior to starting Work.

3.6 FINISHING

A. Remove excess material outside forms and ground wires with a sharp edged cutting screed. Remove ground wires. Shotcrete a thin surface coat (flash coat) containing finer sand than normal. Finish with a steel trowel.

3.7 CURING

A. Two layers of curing compound, which meet the requirements of ASTM C309, or watering 2 times a day for 7 days, are required for curing of finished shotcrete.

3.8 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Engineer shall perform the following inspections and tests, as specified in GENERAL CONCRETE REPAIR REQUIREMENTS Section, as applicable:

   a. Inspection of prepared surface.

   b. Visual inspection of the final repaired area.

   c. Core samples may be required as directed by Engineer.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Repairing spalled concrete or mortar nonshrink conditions

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 Lump Sum Construction bid item of Bid Proposal Line Items that requires nonshrink concrete mortar

1.4 REFERENCES

A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens).

B. ASTM C157/C157M - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.

C. ASTM C882/C882M - Standard Test Method for Bond Strength of Bonding Systems Used with Concrete by Slant Shear.

D. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

1.5 SUBMITTALS

A. The method of spall repair shall be submitted for approval to Engineer prior to commencing Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall comply with manufacturer's written instructions as to environmental conditions under which the materials shall be applied.

B. Packaging and Labeling

1. Materials used shall be delivered to Project Site in clearly labeled, unopened containers.

2. Labels shall be legible, intact, and indicate:

   a. Name of manufacturer

   b. Manufacturer's product identification

   c. Manufacturer's lot number

   d. Manufacturer's instructions for mixing

   e. Hazardous material rating and appropriate warnings for handling

C. Product Handling and Storage

1. Handle materials in a safe manner and avoid breaking container seals.

2. Store materials at temperatures in conformance with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 HORIZONTAL AND VERTICAL REPAIRS

A. Five Star Structural Concrete manufactured by Five Star Products, Inc. for horizontal repair or placement.

2.2 MATERIALS

A. Permanent structural repair materials shall be a one components system that requires just the addition of water. They shall meet the following performance requirements at maximum water.

1. Bond Strength: ASTM C882/C882M

1 Day	1500 psi
7 Days	2500 psi

2. Length Changes: ASTM C157/C157M and ASTM C1107/C1107M

28 Days Dry	0.00%
28 Days Wet	0.00%

3. Compressive Strength: ASTM C109/C109M

2 Hours	2500 psi
1 Day	5000 psi
7 Days	7000 psi

2.3 AGGREGATE

A. Aggregate shall consist of 3/8 inch clean, washed and dried gravel or crushed stone of reasonable uniform quality throughout.

PART 3 - EXECUTION

3.1 PREPARATION

A. Grease, oil, dirt, curing compounds, laitance, and other deleterious materials shall be completely removed from the concrete.

B. Roughen the surfaces by chipping, sandblasting, or other mechanical means and provide a near vertical face on the edges of existing concrete to ensure bond. Lose or broken concrete shall be removed.

C. If existing rebar reinforcing is exposed, it shall be sandblasted, if excessive oxidation has taken place, it shall be coated with a epoxy coating.

D. Surfaces shall be saturated, and free standing excess water shall be removed with clean compressed air before applying the structural repair material.

3.2 INSTALLATION

A. Read and understand manufacturer's written instructions as printed on the container.

B. The mixing operation shall be located close to the repair area. A mortar mixer is recommended. For smaller quantities, an electric drill and paddle mixer is recommended. The mixing order for mortar type mixer shall be as follows:

1. Clean water shall be placed in the mixer at the rate specified on the container instructions. Water content is critical; do not deviate from the rate specified.

2. When temperatures exceed 90 degrees Fahrenheit (F), a pre-packaged set retarder shall be used as recommended by the manufacturer. Add retarder to mixing water maximizing dispersion in the mix.

3. For large pours, add 3/8-inch clean washed pea gravel to the mix at a rate not to exceed 25 pounds per 50 pound pail.

4. Add the repair material. This sequence is important in order to produce a consistent mix and to reduce mixing time. Allow approximately 3 minutes mixing time.

5. When pouring large volumes of material, special consideration should be given to maintaining a continuous flow of material producing a wet leading edge. More than one mixer may be necessary to deliver enough material to insure no cold joints.

C. Placing:

1. Horizontal: Place the mixed material into the prepared area starting from one side of the repair and working to the other side. Do not place the repair material in lifts. Work the material firmly into the bottom and sides of the repair. Screed the material to the desired level. Close up edges of the repair with a trowel. Finish the material to the desired texture.

2. Vertical: Using a trowel, move the material in an upward motion against the cut out substrate. Successive applications shall be troweled against the previously placed material just prior to set. Build up the material to thickness desired. Finish the material to the desired texture.

3. Do not re-temper the material. Clean the mixer and tools periodically with water to prevent build-up, especially in hot temperatures.

D. Curing: As soon as the material sets, exposed surfaces shall be saturated for 30 minutes.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Inspect surfaces to receive structural repair material and verify the following:

a. Surfaces are free of ice, frost, dirt, grease, oil, curing compounds, paints, impregnations, loose material, and other foreign matters likely to affect the bond performance of the material.

b. Surfaces are sufficiently rough to ensure cement bond and that the concrete is structurally sound.

c. That provisions for expansion and control joints are included in installation.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Hot-dip galvanizing of ferrous metal fabrications and structural steel.

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 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 services of a qualified galvanizer who has demonstrated a minimum of ten years' experience in 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 shall be galvanized by 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 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 thickness of zinc coating on metal surface.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Repair materials for damaged galvanizing.

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://www.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

1.2 RELATED SECTIONS

A. Section 05 12 02 - Structural Steel

B. Section 05 50 00 - Metal Fabrications

C. Section 31 62 16 - Steel Pipe Piles

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 D 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 D 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 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% L-100%	W-100% 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% L-100%	--	W-100% L-100% where applicable	W-100% (1) L-100%(1)
3.	Flange Splice	Butt Joint-Groove Welds	W-100% L-100%	W-100% L-25%		
4.	Web Splice					
5.	All Connections & Splices	To check cracks in fillet welds	W-100% L-100%	-- --	-- --	W-100% L-25%
6.	Location to be Determined by the Engineer	Butt Weld	W-100% L-100%	W-25% 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. 2.	Pipe Pile Pilehead to Pile Connection	Circumferential Butt Joint (Girth Weld) - Groove Weld	W-100% L-100%	W-100% (1) L-100% (1)	W-100% (1) L-100% (1)	---
3.	All Connections & Splices	To check cracks in fillet weld	W-100% L-100%	---	---	W-100% 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. Steel pipe piles

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

E. Section 31 62 17 - Steel Pipe Piles

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 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 major features by others.

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.

1.6 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.

1.7 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 and steel pipe piles.

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 and pipe piles.

1.4 REFERENCES

A. AISC S348 - 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 S348.

    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

1.2 RELATED SECTIONS

A. Section 05 05 14 - Treating Damaged Galvanizing

B. Section 05 50 01 - Guard Posts

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. 29 CFR 1910.27 - Scaffolds and Rope Descent Systems.

B. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements.

C. ASME B18.6.3 - Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series).

D. ASME B18.21.1 - Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers (Inch Series).

E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

H. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

I. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.

J. 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.

K. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

L. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes.

M. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

N. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

O. ASTM A435/A435M - Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates.

P. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

Q. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

R. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.

S. 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.

T. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings.

U. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings.

V. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

W. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.

X. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire.

Y. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

Z. ASTM D962 - Standard Specification for Aluminum Powder and Paste Pigments for Paints.

AA. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

BB. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

CC. 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.

DD. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

EE. AWS D1.1/D1.1M - Structural Welding Code - Steel.

FF. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel.

GG. AWS D1.2/D1.2M - Structural Welding Code - Aluminum.

HH. FS TT-V-81 - Varnish: Mixing, for Aluminum Paint.

II. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172.

JJ. NAAMM MBG 531 - Metal Bar Grating Manual.

KK. NAAMM MBG 532 - Heavy Duty Metal Bar Grating Manual.

LL. SSPC-PA 1 - Shop, Field, and Maintenance Coating of Metals.

MM. SSPC-SP 1 - Solvent Cleaning.

NN. SSPC-SP 2 - Hand Tool Cleaning.

OO. SSPC-SP 3 - Power Tool Cleaning.

PP. SSPC-SP 7/NACE No.4 - 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 the State in which the Project is located.

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 304 or 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 except 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/NACE No.4.

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 recleaning 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 Project 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 Project 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. Concrete filled steel guard posts

B. Concrete filled steel guard post protection system

C. Concrete footings

1.2 RELATED SECTIONS

A. Section 05 05 14 - Treating Damaged Galvanizing

B. 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 guard posts.

1.4 REFERENCES

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

D. Reference Specifications (RS):

Section 201 - Concrete, Mortar, and Related Materials

Subsection 201-1 - Portland Cement Concrete

1.5 QUALITY ASSURANCE

A. Welders constructing guard post protection system shall be City of Los Angeles Department of Building and Safety certified. Schedule deputy inspection with Engineer prior to any field welding.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel pipe shall conform to ASTM A53/A53M, welded, Grade B, plain ends, standard weight unless shown otherwise on Drawings, and galvanized in conformance with ASTM A123/A123M if galvanizing is called for on Drawings. Sizes of guard posts shall be as indicated on Drawings.

B. Steel channel for guard post protection system shall be C10x15.3 in conformance with ASTM A36/A36M or as shown on Drawings.

C. Concrete shall conform to RS Subsection 201-1, Class 560 C-3250 for fill and footing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set posts in concrete footings in conformance with Drawings. Fill posts with concrete and crown top. Slope concrete footing around post to drain, and steel trowel finish.

3.2 FINISH AND PROTECTION

A. Paint guard posts and protection system in conformance with PAINTING FOR EXTERIOR IMPROVEMENTS Section. Color shall be safety yellow.

3.3 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. Exterior paint for:

1. Above ground water distribution systems
2. Metal fabrications
3. Guard posts
4. Other elements shown on Drawings or listed in Specifications to receive painting or coating

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

B. Section 05 50 01 - Guard Posts

C. 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/NACE No.3 - 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 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.

1.8 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 form can be found here: https://www.ladbs.org/docs/default-source/forms/green-building-2023/grn_2_voc_content_verification_checklist-01.17.23.pdf?sfvrsn=19f4c153_10

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/NACE No.3.

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 GUARD POSTS, WATER DISTRIBUTION, and CONCRETE WHARF CONSTRUCTION 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. Mooring bollards, structural steel, metal handrails, and guard railings.

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 09 90 01 - Painting for Exterior Improvements

D. Section 31 62 17 - Steel Pipe Piles

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 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/NACE No.2 - 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 shall 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 STEEL PIPE PILES

A. Abrasion resistant epoxy coating system as manufactured by AkzoNobel/Devoe:

1. Primer: AkzoNobel/Devoe Cathacoat 302H Reinforced Inorganic Zinc Primer at 3.0 mils DFT, color:green

2. Finish: AkzoNobel Interzone 954 Modified Epoxy at 17.0 mils DFT, color: haze gray

B. Touch-up and Repair Material:

1. Previously painted piles touch-up: Akzo/Nobel Interzone 954 Modified Epoxy at 17.0 mils DFT, color: haze gray

2.4 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 shall 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 shall 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/NACE No.2 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 DELIVERY, STORAGE, AND HANDLING

A. Deliver mastic in conformance with RS Subsection 210-1.1.

1.7 REGULATORY REQUIREMENTS

A. Sandblasting shall meet South Coast Air Quality Management District (SCAQMD) requirements.

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. Basic electrical materials, methods, and requirements to perform electrical Work.

1.2 RELATED SECTIONS

A. Section 26 01 27 - Field Tests

B. Section 26 01 28 - High Voltage Testing

C. Section 26 05 13 - Medium-Voltage Cables

D. Section 26 05 17 - 35 Kilovolt Rated Shielded Cable

E. Section 26 05 18 - 15 Kilovolt Rated Shielded Cable

F. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables

G. Section 26 05 21 - 600 Volt or Less Rated Wiring System

H. Section 26 05 26 - Grounding and Bonding for Electrical Systems

I. Section 26 05 29 - Hangers and Supports for Electrical Systems

J. Section 26 05 33 - Raceways and Boxes for Electrical Systems

K. Section 26 05 33.13 - Conduit For Electrical Systems

L. Section 26 05 34 - Outlet, Junction, and Pull Boxes

M. Section 26 05 35 - Concrete Pull Boxes

N. Section 26 05 41 - Rigid Galvanized Steel Conduit

O. Section 26 05 42 - PVC Conduit

P. Section 26 05 45 - Underground Electrical Work

Q. Section 26 05 48 - Vibration and Seismic Controls for Electrical Systems

R. Section 26 05 53 - Identification for Electrical Systems

S. Section 26 05 70 - Electrical Systems Analysis

T. Section 26 05 78 - Shore Power Outlet Connection Boxes

U. Section 26 08 02 - Electrical Systems and Products Manufacturer's Certification, Quality Assurance, and Warranty Verification

V. Section 26 09 13 - Electrical Power Monitoring (EPM)

W. Section 26 09 16 - Electrical Controls and Relays

X. Section 26 09 17 - Programmable Controllers

Y. Section 26 09 23 - Lighting Control Devices

Z. Section 26 12 19 - Pad-Mounted, Liquid-Filled, Medium-Voltage Transformers

AA. Section 26 13 00 - Medium-Voltage Switchgear

BB. Section 26 13 21 - Air Interrupter Switches

CC. Section 26 13 31 - 15 kV Metal-Enclosed Switchgear

DD. Section 26 13 32 - 38 kV Metal-Enclosed LADWP Metering Switchgear

EE. Section 26 13 33 - 38 kV Medium Voltage Metal-Enclosed Switchgear

FF. Section 26 13 36 - 15 kV Metal-Clad Switchgear

GG. Section 26 13 37 - 38 kV Metal-Clad Switchgear

HH. Section 26 22 00 - Low-Voltage Transformers

II. Section 26 24 16 - Panelboards

JJ. Section 26 27 26 - Wiring Devices

KK. Section 26 28 13 - Fuses

LL. Section 26 33 53 - Static Uninterruptible Power Supply

MM. Section 26 36 00 - Transfer Switches

NN. Section 26 42 13 - Cathodic Protection

OO. Section 26 56 00 - Exterior Lighting

PP. Section 31 23 33 - Trenching and Backfilling

QQ. 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 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 both hard copy and electronic file.

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 "D" 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 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.

3.6 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.

3.7 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 01 28 - High Voltage Testing

C. Section 26 05 17 - 35 Kilovolt Rated Shielded Cable

D. Section 26 05 18 - 15 Kilovolt Rated Shielded Cable

E. Section 26 05 21 - 600 Volt or Less Rated Wiring System

F. Section 26 05 26 - Grounding and Bonding for Electrical Systems

G. Section 26 05 70 - Electrical Systems Analysis

H. Section 26 13 31 - 15 kV Metal-Enclosed Switchgear

I. Section 26 13 32 - 38 kV Metal-Enclosed LADWP Metering Switchgear

J. Section 26 13 36 - 15 kV Metal-Clad Switchgear

K. Section 26 13 37 - 38 kV Metal-Clad Switchgear

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. High Voltage Cables:

1. After installation of cables and prior to connection, subject cables to a high potential test in conformance with Insulated Cable Engineers Association, Incorporated (ICEA) standards for each voltage category and in conformance with this Section.

2. Applied voltage and timing cycles of voltages shall be as recommended by ICEA standards. Method of shielding cable ends during tests shall comply with National Electrical Testing Association, Incorporated (NETA) and ICEA standards.

D. Relays:

1. Field check overcurrent, ground fault relays, and undervoltage relays for proper operation and calibration.

E. 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.

F. 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.

G. 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. Refer to HIGH VOLTAGE TESTING Section for other requirements for testing.

H. 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.

I. 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. High voltage testing

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 01 27 - Field Tests

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. Test data and results.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 HIGH VOLTAGE DC POTENTIAL TEST

A. Confirm power shut downs with Tenant and obtain prior approval from Engineer prior to shut downs. Refer to FIELD TESTS Section for other requirements of testing.

B. Tests shall be witnessed by Engineer. Notify Engineer 48 hours in advance of testing.

C. Furnish equipment and services for testing at no additional cost to Department.

D. Provide Engineer copies of the test data and results.

E. Test the high voltage conductor for insulation and resistance utilizing a high potential DC tester.

F. Applied DC voltage shall approximate but shall not exceed 5 times the rated RMS Alternating Current Voltage of the conductor.

G. Applied voltage shall be increased to "withstand voltage" gradually over a 1-minute period.

H. Observe and plot maximum leakage current at the maximum applied voltage.

I. Maintain "withstand voltage" for a 15 minute period; leading current shall gradually diminish and stabilize during this period.

J. Failure is indicated if leakage current does not diminish or if it shall decrease followed by an increase.

K. Insulation resistance shall not be less than 1,000 megohms at maximum leakage current during the test.

L. Conductors failing the tests because of improper installation or damage during pulling shall be replaced, installed and re-tested until satisfactory, at Contractor's sole cost and expense.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Medium voltage cable.

1.2 RELATED SECTIONS

A. 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. IEEE C2 - National Electrical Safety Code(R) (NESC(R)).

B. IEEE 48 - IEEE Standard for Test Procedures and Requirements for Alternating-Current Cable Terminations Used on Shielded Cables Having Laminated Insulation Rated 2.5 kV through 765 kV or Extruded Insulation Rated 2.5 kV through 500 kV.

C. NEMA WC 74 - 5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy.

D. NFPA 70 - National Electrical Code.

1.5 SUBMITTALS

A. Product Data: Provide for cable, terminations, and accessories.

B. Sustainable Design Documentation: Submit manufacturer's product data on conductor and cable showing compliance with specified lead content requirements.

C. Samples: Submit two samples of each size cable, 24 inches in length.

1. Select each length to include complete set of manufacturer markings.

2. Attach tag indicating cable size and application information.

D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

E. Maintenance Data: Include instructions for testing and cleaning cable and accessories.

1.6 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience and with service facilities within 100 miles of Project.

C. Installer Qualifications: Authorized installer of specified manufacturer with service facilities within 100 miles of Project.

D. Products: Listed, classified, and labeled as suitable for the purpose intended.

PART 2 - PRODUCTS

2.1 MEDIUM-VOLTAGE CABLE

A. Manufacturers:

1. Okonite: www.okonite.com.

2. Southwire Company: www.southwire.com.

B. Medium Voltage Cable: NEMA WC 74 ethylene propylene insulated cable.

1. Conductor: Copper, compact round, stranded, with foil conductor shield.

2. Construction: Single conductor with metal wire insulation shielding.

3. Insulation Jacket: PVC.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that conduit, duct, trench, or manholes are ready to receive cable.

B. Verify that field measurements are as indicated.

C. Verify routing and termination locations of cable bank prior to rough-in.

3.2 PREPARATION

A. Use swab to clean conduits before pulling cables.

3.3 INSTALLATION

A. Avoid abrasion and other damage to cables during installation.

B. Use suitable lubricants and pulling equipment.

C. Sustain cable pulling tensions and bending radii below recommended limits.

D. Ground cable shield at each termination and splice.

E. Install cables in manholes along wall providing longest route.

F. Arrange cable in manholes to avoid interference with duct entrances.

G. Fireproof cables in manholes using fireproofing tape in half-lapped wrapping. Extend fireproofing 1 inch into duct.

3.4 FIELD QUALITY CONTROL

A. Inspect exposed cable sections for physical damage.

B. Inspect cable for proper connections as indicated.

C. Inspect shield grounding, cable supports, and terminations for proper installation.

3.5 PROTECTION

A. Protect installed cables from entrance of moisture.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. 35 kilovolt (kV) rated shielded cable system

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 01 28 - High Voltage Testing

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.

1.4 REFERENCES

A. AEIC CS8 - Specification for Extruded Dielectric Shielded Power Cables Rated 5 Through 46 kV.

B. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire.

C. ASTM B496 - Standard Specification for Compact Round Concentric-Lay-Stranded Copper Conductors.

D. ICEA S-93-639 - 5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy.

E. ICEA S-94-649 - Concentric Neutral Cables Rated 5 Through 46kV.

F. ICEA S-97-682 - Standard for Utility Shielded Power Cables Rated 5 Through 46 kV.

G. IEEE 48 - IEEE Standard for Test Procedures and Requirements for Alternating-Current Cable Terminations Used on Shielded Cables Having Laminated Insulation Rated 2.5 kV through 765 kV or Extruded Insulation Rated 2.5 kV through 500 kV.

H. IEEE 386 - IEEE Standard for Separable Insulated Connector Systems for Power Distribution Systems Rated 2.5 kV through 35 kV.

I. IEEE 404 - Extruded and Laminated Dielectric Shielded Cable Joints Rated 2.5 kV to 500 kV.

J. UL 1072 - Medium-Voltage Power Cables.

1.5 SUBMITTALS

A. Submit to Engineer the following:

1. Shop drawings, catalog cuts, and specification sheets which shall include cable outside diameter, pulling tension limit, minimum bending radius, ampacity, standards the cable meets, cross sectional detail of the cable, procedure, and method of splicing and terminating the cable, splice and termination kits, procedure for field testing, and test report forms. Test reports shall be in conformance with Institute of Electrical and Electronics Engineers (IEEE) and American National Standards Institute (ANSI) standards on ethylene-propylene rubber (EPR) insulated power cable. Do not order cables prior to receipt of approval.

2. Certified factory test reports covering cable furnished, prior to production of cable. Test reports shall be in conformance with Insulated Cable Engineers Association, Incorporated (ICEA), National Electrical Manufacturers Association (NEMA), and Underwriters Laboratories, Incorporated (UL) Standards.

3. Installers' qualifications prior to start of Work.

4. Copy of manufacturer's high potential test recommendations specifying high voltage potential, ground current, and number of cycles.

5. Method of pulling 35 kV cable that provides constant tension on cable, such as a winch.

6. Submit results of high potential tests including:

a. Current leakage at each potential level.

b. Instrument used in tests with manufacturer's serial number and last date of calibration.

c. Project Site conditions including ambient air temperature, humidity, and environmental conditions.

7. Certification signed by factory representative that cable was manufactured in conformance with this Section.

8. Certified report of factory tests performed in conformance with AEIC CS8, Section E and ICEA S-94-649 or ICEA S-97-682, Part 3 for approval prior to shipment of cable from the factory. Provide copy of original X-Y corona discharge plot with the certification.

1.6 QUALITY ASSURANCE

A. Installers shall have minimum 5 years of experience in high voltage cable installation.

B. Electricians performing splices and terminations shall be experienced in the specified type and class of cable.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver cables on original reels as shipped by manufacturer with end of cables effectively sealed against moisture.

B. Handle and store cables in conformance with manufacturer’s written instructions.

1.8 WARRANTY

A. In addition to the terms of Guarantee Subsection of GENERAL CONDITIONS Section, provide a 5 year warranty on the cable materials and workmanship commencing after installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cable shall be Okoguard-Okoseal Type MV-105 35 kV shielded power cable as manufactured by Okonite Company (562) 590-3070. Cable shall be UL listed as MV-105 in conformance with UL 1072, City of Los Angeles Department of Building and Safety approved, 133 percent insulation level, and of the following construction:

1. Conductor: Compact, round, stranded Class B copper with lay and number of wires conforming to ASTM B496.

a. Round wires shall be soft or annealed bare copper conforming to elongation, resistivity, and finish requirements of ASTM B3 before stranding.

2. Strand Screen: Extruded, semi conducting ethylene-propylene rubber (EPR). Meets or exceeds electrical and physical requirements of ICEA S-93-639; AEIC CS8, and UL 1072.

3. Insulation: 420 mils EPR; resistant to heat, moisture, ozone, and corona; high dielectric strength meeting or exceeding electrical and physical requirements of AEIC CS8, UL 1072, and ICEA S-93-639.

4. Insulation Screen: Extruded, semi conducting EPR. Meets or exceeds electrical and physical requirements of ICEA S-93-639; AEIC CS8, and UL 1072.

5. Shielding: 5 mil bare copper shielding tape applied helically with minimum normal overlap.

6. Jacket: The overall jacket shall be 80 mils black PVC, conforming to ICEA S-93-639.

B. Cable shall be rated to 105 degrees Celsius (C) continuous operating temperature, 140 degrees C emergency overload and 250 degrees C short circuit condition.

C. Each length of jacketed, single conductor cable shall be capable of withstanding 7 kVAC (spark test) for a minimum of 0.15 seconds in conformance with ICEA S-93-639.

D. Identification:

1. Each cable shall be stamped at not more than 24 inches on center with printing identifying cable size, number of conductors, manufacturer, “EPR Type MV-105”, voltage and insulation level, and year of manufacture.

2. Cable shall bear a tag containing name of manufacturer, National Electrical Code (NEC) designation, and year of manufacture.

E. Provide splice and termination kits in conformance with cable manufacturer's written instructions.

1. Splices shall have been qualified to IEEE 386 and IEEE 404. Qualification shall have been performed on EPR insulated, copper tape, drain wire, or unshielded power cables. A certified test report is required. Splices shall be able to accommodate the voltage class, conductor size, and shielding type of the cable. Splices shall be a factory-engineered kit including a copper ground braid for through fault current, and shielding mesh to cover the entire splice body.

2. Terminations shall have been qualified to IEEE 48 for a Class I termination. Qualification shall have been performed on EPR insulated, copper tape, drain wire, or unshielded power cables. A certified test report is required. Terminations shall be designed to accommodate the voltage class, conductor size, and shielding type of the cable.

F. Provide cable pulling eyes and grips for the type of cable involved.

G. Cable shall be suitable for use in wet and dry locations in conduit or in underground duct systems.

H. Cable shall not have been manufactured more than 1 year prior to delivery.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Cable Pulling:

1. Employ temporary guides, sleeves, rollers, and other hardware to protect cables from excess tension, abrasion, or damage during installation.

2. Do not exceed tension or bending radii recommended by cable manufacturer.

3. Protect cables from abrasion and contact with moisture.

4. Provide a tension gage and continuously monitor the tension during cable installation.

B. Splices and Terminations:

1. Perform Work in dry weather, using clean, dry tools, and complete each unit the same day as begun.

2. Install splices, terminations, and stress relief cones as recommended by the wire manufacturer.

3. Shielding shall be grounded at both ends in conformance with wire manufacturer's written instructions.

4. Rejacket the entire splice with a coated heat shrink tubing.

5. Connect copper tape shields to ground with a solder blocked copper ground braid using a spring clamp connection encapsulated with a sealing mastic. Heat shrink insulation is acceptable.

C. Continuous Cable:

1. Cable runs shall be continuous between terminations. Splices are permitted, where called for on Drawings.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Perform high voltage potential test of the cables before and after installation in the presence of Engineer and the electrical inspector of City of Los Angeles Department of Building and Safety.

a. Prior to performing test, disconnect electronic control circuits to prevent damage from high voltage.

b. Test each length of cable.

c. Begin test at 10 kV and increase voltage in increments of 10 kV up to 100 kV. Apply each voltage for 1 minute. Record current leakage at each potential level.

d. If current leakage is unstable or tests are otherwise unsatisfactory, correct the cause of the failure.

e. If cause of failure is determined to be faulty cable, replace entire reel.

f. Refer to HIGH VOLTAGE TESTING Section for other requirements.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. 15 kilovolt (kV) rated shielded cable system

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 01 28 - High Voltage Testing

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.

1.4 REFERENCES

A. AEIC CS8 - Specification for Extruded Dielectric Shielded Power Cables Rated 5 Through 46 kV.

B. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire.

C. ASTM B496 - Standard Specification for Compact Round Concentric-Lay-Stranded Copper Conductors.

D. ICEA S-93-639 - 5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy.

E. ICEA S-94-649 - Concentric Neutral Cables Rated 5 Through 46kV.

F. ICEA S-97-682 - Standard for Utility Shielded Power Cables Rated 5 Through 46 kV.

G. IEEE 48 - IEEE Standard for Test Procedures and Requirements for Alternating-Current Cable Terminations Used on Shielded Cables Having Laminated Insulation Rated 2.5 kV through 765 kV or Extruded Insulation Rated 2.5 kV through 500 kV.

H. IEEE 386 - IEEE Standard for Separable Insulated Connector Systems for Power Distribution Systems Rated 2.5 kV through 35 kV.

I. IEEE 404 - Standard for Extruded and Laminated Dielectric Shielded Cable Joints Rated 2.5 kV to 500 kV.

J. UL 1072 - Medium-Voltage Power Cables.

1.5 SUBMITTALS

A. Submit to Engineer the following:

1. Shop drawings, catalog cuts, and specification sheets which shall include cable outside diameter, pulling tension limit, minimum bending radius, ampacity, standards the cable meets, cross sectional detail of the cable, procedure, and method of splicing and terminating the cable, splice and termination kits, procedure for field testing, and test report forms. Test reports shall be in conformance with Institute of Electrical and Electronics Engineers (IEEE) and American National Standards Institute (ANSI) standards on ethylene-propylene rubber (EPR) insulated power cable. Do not order cables prior to receipt of approval.

2. Certified factory test reports covering cable furnished, prior to production of cable. Test reports shall be in conformance with Insulated Cable Engineers Association, Incorporated (ICEA), National Electrical Manufacturers Association (NEMA), and Underwriters Laboratories, Incorporated (UL) Standards.

3. Installers’ qualifications prior to start of Work.

4. Copy of manufacturer’s high potential test recommendations specifying high voltage potential, ground current, and number of cycles.

5. Method of pulling 15 kV cable that provides constant tension on cable, such as a winch.

6. Submit results of high potential tests including:

a. Current leakage at each potential level.

b. Instrument used in tests with manufacturer’s serial number and last date of calibration.

c. Project Site conditions including ambient air temperature, humidity, and environmental conditions.

7. Certification signed by factory representative that cable was manufactured in conformance with this Section.

8. Certified report of factory tests performed in conformance with AEIC CS8, Section E and ICEA S-94-649 or ICEA S-97-682, Part 3 for approval prior to shipment of cable from the factory. Provide copy of original X-Y corona discharge plot with the certification.

1.6 QUALITY ASSURANCE

A. Installers shall have minimum 5 years of experience in high voltage cable installation.

B. Electricians performing splices and terminations shall be experienced in the specified type and class of cable.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver cables on original reels as shipped by manufacturer with end of cables effectively sealed against moisture.

B. Handle and store cables in conformance with manufacturer’s written instructions.

1.8 WARRANTY

A. In addition to the terms of Guarantee Subsection of GENERAL CONDITIONS Section, provide a 5 year warranty on the cable materials and workmanship commencing after installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cable shall be Okoguard-Okoseal Type MV-105 15 kV shielded power cable as manufactured by Okonite Company (562) 590-3070. Cable shall be UL listed as MV-105 in conformance with UL 1072, City of Los Angeles Department of Building and Safety approved, 133 percent insulation level, and of the following construction:

1. Conductor: Compact, round, stranded Class B copper with lay and number of wires conforming to ASTM B496.

a. Round wires shall be soft or annealed bare copper conforming to elongation, resistivity, and finish requirements of ASTM B3 before stranding.

2. Strand Screen: Extruded, semi conducting ethylene-propylene rubber (EPR). Meets or exceeds electrical and physical requirements of ICEA S-93-639; AEIC CS8, and UL 1072.

3. Insulation: 220 mils EPR; resistant to heat, moisture, ozone, and corona; high dielectric strength meeting or exceeding electrical and physical requirements of AEIC CS8, UL 1072, and ICEA S-93-639.

4. Insulation Screen: Extruded, semi conducting EPR. Meets or exceeds electrical and physical requirements of ICEA S-93-639; AEIC CS8, and UL 1072.

5. Shielding: 5 mil bare copper shielding tape applied helically with 12 1/2 percent normal overlap.

6. Jacket: The overall jacket shall be 80 mils black PVC, conforming to ICEA S-93-639.

B. Cable shall be rated to 105 degrees Celsius (C) continuous operating temperature, 140 degrees C emergency overload and 250 degrees C short circuit condition.

C. Each length of jacketed, single conductor cable shall be capable of withstanding 7 kVAC (spark test) for a minimum of 0.15 seconds in conformance with ICEA S-93-639.

D. Identification:

1. Each cable shall be stamped at not more than 24 inches on center with printing identifying cable size, number of conductors, manufacturer, “EPR Type MV-105”, voltage and insulation level, and year of manufacture.

2. Cable shall bear a tag containing name of manufacturer, NEC designation, and year of manufacture.

E. Provide splice and termination kits in conformance with cable manufacturer's written instructions.

1. Splices shall have been qualified to IEEE 386 and IEEE 404. Qualification shall have been performed on EPR insulated, copper tape, drain wire, or unshielded power cables. A certified test report is required. Splices shall be able to accommodate the voltage class, conductor size, and shielding type of the cable. Splices shall be a factory-engineered kit including a copper ground braid for through fault current, and shielding mesh to cover the entire splice body.

2. Terminations shall have been qualified to IEEE 48 for a Class I termination. Qualification shall have been performed on EPR insulated, copper tape, drain wire, or unshielded power cables. A certified test report is required. Terminations shall be designed to accommodate the voltage class, conductor size, and shielding type of the cable.

F. Provide cable pulling eyes and grips for the type of cable involved.

G. Cable shall be suitable for use in wet and dry locations in conduit or in underground duct systems.

H. Cable shall not have been manufactured more than 1 year prior to delivery.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Cable Pulling:

1. Employ temporary guides, sleeves, rollers, and other hardware to protect cables from excess tension, abrasion, or damage during installation.

2. Do not exceed tension or bending radii recommended by cable manufacturer.

3. Protect cables from abrasion and contact with moisture.

4. Provide a tension gage and continuously monitor the tension during cable installation.

B. Splices and Terminations:

1. Perform Work in dry weather, using clean, dry tools, and complete each unit the same day as begun.

2. Install splices, terminations, and stress relief cones as recommended by the wire manufacturer.

3. Ground shielding at both ends in conformance with wire manufacturer's written instructions.

4. Rejacket the entire splice with a coated heat shrink tubing.

5. Connect copper tape shields to ground with a solder blocked copper ground braid using a spring clamp connection encapsulated with a sealing mastic. Heat shrink insulation is acceptable.

C. Continuous Cable:

1. Cable runs shall be continuous between terminations. Splices are permitted, where called for on Drawings.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Perform high voltage potential test of the cables before and after installation in the presence of Engineer and the electrical inspector of City of Los Angeles Department of Building and Safety.

a. Prior to performing test, disconnect electronic control circuits to prevent damage from high voltage.

b. Test each length of cable.

c. Begin test at 10 kV and increase voltage in increments of 10 kV up to 100 kV. Apply each voltage for 1 minute. Record current leakage at each potential level.

d. If current leakage is unstable or tests are otherwise unsatisfactory, correct the cause of the failure.

e. If cause of failure is determined to be faulty cable, replace entire reel.

f. Refer to HIGH VOLTAGE TESTING Section for other requirements.

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. NECA 1 - Standard for Good Workmanship in Electrical Construction.

G. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.

H. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems.

I. NFPA 70 - National Electrical Code.

J. UL 44 - Thermoset-Insulated Wires and Cables.

K. UL 83 - Thermoplastic-Insulated Wires and Cables.

L. UL 486A-486B - Wire Connectors.

M. UL 486C - Splicing Wire Connectors.

N. UL 486D - Sealed Wire Connector Systems.

O. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape.

1.5 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.

1.6 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.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in conformance with manufacturer's written instructions.

1.8 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.

1.9 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.

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 not permitted.

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 required conduit, boxes, wiring, connectors, and the like as required for a complete operating system.

E. Comply with NEMA WC 70.

F. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

G. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

H. 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.

I. 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.

J. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

K. 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, Systems: Green.

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 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

2.5 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 Work likely to damage wire and cable has been completed.

B. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in conformance with NFPA 70.

C. Verify that field measurements are as indicated.

D. 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 ft 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 and voltage drop.

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. 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.

E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

F. 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.

G. Terminate cables using suitable fittings.

H. Install conductors with a minimum of 12 inches of slack at each outlet.

I. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.

J. Neatly train and bundle conductors inside boxes, wireways, panelboards, and other equipment enclosures.

K. Group or otherwise identify neutral and grounded conductors with associated ungrounded conductors inside enclosures in conformance with NFPA 70.

L. 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.

M. 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.

N. Insulate ends of spare conductors using vinyl insulating electrical tape.

O. Identify conductors and cables in compliance with IDENTIFICATION FOR ELECTRICAL SYSYTEMS Section.

P. 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 19 - Low-Voltage Electrical Power Conductors and Cables

C. Section 26 05 26 - Grounding and Bonding for Electrical Systems

D. Section 26 05 41 - Rigid Galvanized Steel Conduit

E. 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. ABB Installation Products (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 conformance 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 21 - 600 Volt or Less Rated Wiring System

C. 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 requirements and components for equipment, conduit, cable, boxes, and other electrical Work.

1.2 RELATED SECTIONS

A. Section 03 15 20 - Anchorage to Concrete

B. Section 05 50 00 - Metal Fabrications

C. Section 26 05 33.13 - Conduit for Electrical Systems

D. Section 26 05 48 - Vibration and Seismic Controls for Electrical Systems

E. Section 26 56 00 - Exterior Lighting

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 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. NFPA 70 - National Electrical Code.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes and arrangement of supports and bases with actual equipment and components to be installed.

2. Coordinate work to provide additional framing and materials required for installation.

3. Coordinate compatibility of support and attachment components with mounting surfaces at installed locations.

4. Coordinate arrangement of supports with ductwork, piping, equipment and other potential conflicts.

5. Notify Engineer of 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 channel/strut framing systems, nonpenetrating rooftop supports, and post-installed concrete/masonry anchors.

1. Fiberglass Channel/Strut Framing Systems: Include requirements for strength derating according to ambient temperature.

B. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.

1.7 QUALITY ASSURANCE

A. Maintain at Project Site one copy of each referenced document that prescribes execution requirements.

B. Installer Qualifications for Powder-Actuated Fasteners: Certified by fastener system manufacturer with current operator's license.

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 the following. Where requirements differ, comply with most stringent.

a. NFPA 70.

b. Requirements of authorities having jurisdiction.

2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of electrical work.

3. Provide products listed, classified, and labeled as suitable for 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 load to be supported with minimum safety factor of 3. Include consideration for vibration, equipment operation, and shock loads where applicable.

5. Do not use products for applications other than as permitted by NFPA 70 and product listing.

6. Steel Components: Use corrosion-resistant materials suitable for environment where installed.

a. Zinc-Plated Steel: Electroplated in conformance with ASTM B633.

b. Galvanized Steel: Hot-dip galvanized after fabrication in conformance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps and clamps suitable for conduit or cable to be supported.

1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.

2. Conduit Clamps: Bolted type unless otherwise indicated.

C. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.

D. Metal Channel/Strut Framing Systems:

1. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.

2. Comply with MFMA-4.

E. Hanger Rods: Threaded, zinc-plated steel unless otherwise indicated.

F. Anchors and Fasteners:

1. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.

2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.

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, or other systems.

D. Unless specifically indicated or approved by Engineer, do not provide support from suspended ceiling support system or ceiling grid.

E. Unless specifically indicated or approved by Engineer, do not provide support from roof deck.

F. Do not penetrate or otherwise notch or cut structural members without approval of Engineer.

G. Identify independent electrical component support wires above accessible ceilings, where permitted, with color distinguishable from ceiling support wires in conformance with NFPA 70.

3.3 FIELD QUALITY CONTROL

A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Galvanized steel rigid metal conduit (RMC).

1.2 RELATED SECTIONS

A. Section 26 05 29 - Hangers and Supports for Electrical Systems

B. Section 26 05 48 - Vibration and Seismic Controls for Electrical Systems

C. Section 26 05 53 - Identification for Electrical Systems

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 REFERENCES

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC).

B. ASTM F1055 - Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing.

C. NECA 1 - Standard for Good Workmanship in Electrical Construction.

D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT).

E. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC).

F. NEMA BI-50006 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.

G. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit.

H. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing.

I. NFPA 70 - National Electrical Code.

J. UL 6 - Electrical Rigid Metal Conduit-Steel.

K. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

B. Shop Drawings:

1. Indicate proposed arrangement for conduits to be installed within structural concrete slabs, where permitted.

1.6 QUALITY ASSURANCE

A. Documents at Project Site: Maintain at project site one copy of manufacturer's written instructions and shop drawings.

1.7 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate minimum sizes of conduits with actual type and quantity of conductors to be installed, including adjustments for conductor sizes increased for voltage drop.

PART 2 - PRODUCTS

2.1 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's written instructions, and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.

C. Underground:

1. Exterior, Embedded Within Concrete: Use rigid PVC conduit.

2. Where rigid polyvinyl chloride (PVC) conduit is provided, transition to PVC-coated galvanized steel rigid metal conduit (RMC) or schedule 80 rigid PVC conduit where emerging from underground.

D. Exposed, Exterior, Not Subject to Severe Physical Damage: Use PVC-coated galvanized steel rigid metal conduit (RMC).

E. Exposed, Exterior, Subject to Severe Physical Damage: Use PVC-coated galvanized steel rigid metal conduit (RMC).

2.2 CONDUIT - GENERAL REQUIREMENTS

A. Comply with NFPA 70.

B. Provide conduit, fittings, supports, and accessories required for complete raceway system.

C. Provide products listed, classified, and labeled as suitable for purpose intended.

D. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Manufacturers:

1. ABB; Ocal: www.electrification.us.abb.com.

2. Calbond, a division of Atkore International: www.calbond.com.

3. Robroy Industries: www.robroy.com.

B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA BI-50006 and listed and labeled as complying with UL 6.

C. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil, 0.040 inch.

D. Interior Coating: Urethane, minimum thickness of 2 mil, 0.002 inch.

E. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil, 0.015 inch.

2.4 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

A. Manufacturers:

1. ABB; Carlon: www.carlon.com.

2. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com.

3. Cantex Inc: www.cantexinc.com.

B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 194 degrees Fahrenheit (F).

C. Fittings:

1. Manufacturer: Same as manufacturer of conduit to be connected.

2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

3.2 INSTALLATION

A. Install products in conformance with manufacturer's written instructions.

B. Install conduit in conformance with NECA 1.

C. Galvanized Steel Rigid Metal Conduit (RMC): Install in conformance with NECA 101.

D. PVC-Coated Galvanized Steel Rigid Metal Conduit (RMC): Install using only tools approved by manufacturer.

E. Rigid Polyvinyl Chloride (PVC) Conduit: Install in conformance with NECA 111.

F. Conduit Support:

1. Secure and support conduits in conformance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS Section.

2. Provide required vibration isolation and/or seismic controls; see VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS Section.

3. Use metal channel/strut with accessory conduit clamps to support multiple parallel surface-mounted conduits.

4. Use trapeze hangers assembled from threaded rods and metal channel/strut with accessory conduit clamps to support multiple parallel suspended conduits.

5. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with most stringent requirements.

G. Underground Installation:

1. Provide trenching and backfilling; see TRENCHING AND BACKFILLING Section.

2. Provide underground warning tape along entire conduit length for service entrance where not concrete-encased; see IDENTIFICATION FOR ELECTRICAL SYSTEMS Section.

3.3 FIELD QUALITY CONTROL

A. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in conformance with manufacturer's instructions.

B. Correct deficiencies and replace damaged or defective conduits.

3.4 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

3.5 PROTECTION

A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

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 BI-50006 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel 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 BI-50006 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 noted otherwise 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 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.

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 below grade: PVC Schedule 40

   b. Surface or exposed: Rigid Steel conduit, PVC coated.

   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. Rigid plastic conduit shall be supported at 4'-0" spacings.

j. Provide grounding conductor in non-metallic conduits. Conduits are sized on Drawings for metallic conduit and copper cables. Increase conduit capacity if required.

k. Install circuits rated above 600 volts in rigid galvanized conduits above ground.

l. Install grounding conductor in conformance with City of Los Angeles Electrical Code.

m. 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 not 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.

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, and 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. 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 18 - 15 Kilovolt Rated Shielded Cable

D. Section 26 05 21 - 600 Volt or Less Rated Wiring System

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 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 BI-50006 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel 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 BI-50006 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 18 - 15 Kilovolt Rated Shielded Cable

C. Section 26 05 21 - 600 Volt or Less Rated Wiring System

D. 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 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 utilities duct

C. Moisture sealing materials

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 BI-50006 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel 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 TC 6&8 - 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 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 ELECTRICAL MATERIALS AND METHODS Section. Inspect for damage.

B. Store and protect in conformance with manufacturer’s written instructions.

1.8 FIELD 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 ductbank 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

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 BI-50006.

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 TC 6&8, 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. Vibration isolation requirements.

B. Seismic control requirements.

C. Vibration-isolated equipment support bases.

D. Vibration isolators.

E. Seismic restraint systems.

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

B. Section 26 05 29 - Hangers and Supports 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. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

B. MFMA-4 - Metal Framing Standards Publication.

C. NFPA 70 - National Electrical Code.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate selection and arrangement of vibration isolation and/or seismic control components with the actual equipment to be installed.

2. Coordinate Work with other trades to provide additional framing and materials required for installation.

3. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.6 DEFINITIONS

A. Electrical Component: Where referenced in this section in regards to seismic controls, applies to any portion of the electrical system subject to seismic evaluation in conformance with applicable codes, including distributed systems (e.g., conduit, cable tray).

B. Seismic Restraint: Structural members or assemblies of members or manufactured elements specifically designed and applied for transmitting seismic forces between components and the seismic force-resisting system of the structure.

1.7 SUBMITTALS

A. Design Documents: Prepare and submit information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, details, and calculations.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for products, including materials, fabrication details, dimensions, and finishes.

1. Seismic Controls: Include seismic load capacities.

C. Shop Drawings - Seismic Controls:

1. Include dimensioned plan views and sections indicating proposed electrical component locations and distributed system routing, with locations and details of gravity supports and seismic restraints and associated attachments.

2. Identify mounting conditions required for equipment seismic qualification.

3. Identify anchor manufacturer, type, minimum embedment, minimum spacing, minimum member thickness, and minimum edge distance requirements.

4. Indicate proposed arrangement of distributed system trapeze support groupings.

5. Indicate proposed locations for distributed system flexible fittings and/or connections.

6. Indicate locations of seismic separations where applicable.

7. Include point load drawings indicating design loads transmitted to structure at each attachment location.

D. Seismic Design Data:

1. Compile information on project-specific characteristics of actual installed electrical components necessary for determining seismic design forces required to design appropriate seismic controls, including but not limited to the following.

a. Component amplification factor (ap) and component response modification factor (Rp), determined in conformance with ASCE 7 tables.

2. Include structural calculations, stamped or sealed by seismic controls designer, demonstrating suitability of seismic controls for seismic design forces.

E. Certification for seismically qualified equipment; identify basis for certification.

F. Evaluation Reports: For products specified as requiring evaluation and recognition by a qualified evaluation service, provide current evaluation reports.

G. Manufacturer's 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.

H. Evidence of qualifications for seismic controls designer.

I. Evidence of qualifications for manufacturer.

J. Manufacturer’s detailed field testing and inspection procedures.

K. Field quality control test reports.

1.8 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Comply with ICC (IBC).

C. Maintain at Project Site a copy of each referenced document that prescribes execution requirements.

D. Seismic Controls Designer Qualifications: Registered professional engineer licensed in the State of California and with minimum 5 years experience designing seismic restraints for nonstructural components.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in conformance with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATION REQUIREMENTS

A. Design and provide vibration isolation systems to reduce vibration transmission to supporting structure from vibration-producing electrical equipment and/or electrical connections to vibration-isolated equipment.

B. General Requirements:

1. Select vibration isolators to provide required static deflection.

2. Select vibration isolators for uniform deflection based on distributed operating weight of actual installed equipment.

3. Select vibration isolators for outdoor equipment to comply with wind design requirements.

C. Equipment Isolation:

1. Transformers:

a. Specified vibration isolators are in addition to any factory-installed internal core and coil assembly vibration isolators unless otherwise indicated.

b. Floor-Mounted Transformers, Nonseismic Applications: Use resilent material isolator pads, resilient material isolator mounts, or open (unhoused) spring isolators.

c. Floor-Mounted Transformers, Seismic Applications: Use seismic type resilient material isolator mounts or seismic type restrained spring isolators.

D. Conduit Isolation:

1. Use flexible conduit or cable for electrical connections to vibration-isolated equipment, including equipment installed under other sections or by others.

    a. Minimum Length: 3 feet unless otherwise indicated.

2. Vibration Isolators:

    a. Provide vibration isolators for conduit supports:

        1) Located within 50 feet of connected vibration-isolated equipment where flexible connection to equipment is not possible.

        2) For conduits over 2 inch trade size located below or within 50 feet of noise-sensitive areas indicated.

2.2 SEISMIC CONTROL REQUIREMENTS

A. Design and provide electrical component restraints, supports, and attachments suitable for seismic loads determined in conformance with applicable codes, as well as gravity and operating loads and other structural design considerations of the installed location. Consider wind loads for outdoor electrical components.

B. Seismic Design Criteria: As indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on Drawings.

3.2 CODE-REQUIRED SPECIAL INSPECTIONS

A. Frequency of Special Inspections: Where special inspections are designated as continuous or periodic, arrange Work accordingly.

1. Continuous Special Inspections: Special Inspection Agency to be present in the area where Work is being performed and observe Work at all times Work is in progress.

3.3 INSTALLATION

A. Install products in conformance with manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

A. Provide services of a manufacturer's authorized representative for vibration isolation systems and seismic controls to observe installation and assist in inspection and testing. Include manufacturer's detailed testing and inspection procedures and field reports with submittals.

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.

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

B. Section 26 13 36 - 15 kV Metal-Clad Switchgear

C. Section 26 13 37 - 38 kV Metal-Clad Switchgear

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 551 - IEEE Recommended Practice for Calculating Short-Circuit Currents in Industrial and Commercial Power Systems.

E. IEEE 1584 - IEEE Guide for Performing Arc-Flash Hazard Calculations.

F. IEEE C57.12.00 - IEEE Standard for General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.

G. IEEE C57.12.01 - IEEE Standard for General Requirements for Dry-Type Distribution and Power Transformers.

H. NEMA Z535.4 - Product Safety Signs and Labels.

I. NFPA 70 - National Electrical Code.

J. 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. Gather and tabulate the following input data to support the short-circuit study. Study shall include entire electrical system including the electric utility service company (City of Los Angeles Department of Water and Power (LADWP)) provided protective relays. Comply with recommendations in IEEE 551 as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of Engineer in charge of performing the study, and shall be by Engineer who holds ANSI/NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.

1. Obtain electrical power utility impedance at the service.

2. Coodinate with LADWP and obtain utility company's protective relay data for incorporation in to the study.

B. Equipment and component titles used in the studies shall be identical to equipment and component titles shown on Drawings.

C. Perform studies using following software:

1. Easy Power.

D. 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.

E. Use proposed and existing load data for study obtained from Contract Documents and revised system configuration, wiring information, and equipment.

F. 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.

G. 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. Cable and conduit material data.

b. Bus data.

c. Transformer data.

d. 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. Shore power outlet connection boxes

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 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 REFERENCES

A. 29 CFR 1910 - Occupational Safety and Health Standards.

B. ISO 3522 - Aluminum and Aluminum alloys - Castings - Chemical Composition and Mechanical Properties.

1.5 SUBMITTALS

A. Catalog cuts or shop drawings for receptacle assemblies including housing.

B. Certification that the equipment meets City of Los Angeles Electrical Code.

1.6 QUALITY ASSURANCE

A. Equipment and material shall be the latest design, new, un-deteriorated, and the first quality standard product of the manufacturer.

B. When 2 or more units of the same class of equipment are required, units shall be products of a single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Equipment shall be stored in a shelter or safe area away from any possible collision damage.

B. Equipment shall not be stored in a stacked arrangement.

C. Equipment, if not installed, shall be suitably sealed in their original packaging for long term storage and stored in a clean, dry area.

D. General condition of equipment shall be inspected at regular intervals.

1.8 MAINTENANCE

A. Manufacturer shall have a service center office within the State of California where common spare parts for the shore power outlet assemblies shall be available.

B. Shore power outlet connection box, vault cover, and shore power medium voltage connector manufacturer shall have a dedicated field service team based in Southern California able to provide maintenance and product training on the equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Cavotec, (714) 545-7900.

2.2 MATERIALS

A. Components detailed below or shown on Drawings shall be supplied by the shore power outlet connection box manufacturer as a complete factory assembled package ready for installation. Internal components required are as follows:

1. Shore power outlet connection box shall be fabricated in American Iron and Steel Institute (AISI) 304 stainless steel (powder coated gray) and dimensioned as identified on Drawings and Specifications. Shore power outlet connection box shall be National Electrical Manufacturers Association (NEMA) 4X compliant and rated at 11 kilovolt (kV) / 350 amperes (amps) for each plug, as manufactured by Cavotec. Shore power outlet connection box shall be shipped from the manufacturer's US-based factory as a complete sub-assembly inclusive of the shore power outlet connection box, push pull 11 kV sockets, and fiber optic junction box with pigtails. The sub assembly shall be Underwriter Laboratories, Incorporated (UL) field evaluated in the manufacturer's factory prior to shipment and approved to 29 CFR 1910. The shore power outlet connection box shall include a pair of 4 x Cavotec PC6 11 kV push-pull sockets (Configuration: 3Ph+E+3pilots) part number PC6-VX04-L18537KLM (color as indicated on drawings). The connectors shall be compliant with Protection index Ingress Protection Rating (IP) 66 and keyed differently so that each shall mate only with the respective socket. The connector design shall incorporate a cam device with automatic spring loaded socket cover. The handle side plates shall be manufactured in bronze (ISO 3522, CuSn5PbZn5) and shall incorporate a stainless steel hold open feature that secures the handle in an open position during the connection procedure. The socket housing shall be aluminum (ISO 3522, AL-Si7MgFe) and fastening and movable components shall be fabricated in stainless steel. The sockets shall each be rated to a maximum voltage of 11 kV alternating current (AC) and nominal amperage of 350 amperes. Socket manufacturer shall provide test documentation upon request to confirm compliance with the following requirements:

    a. Test Voltage Phase to Ground (conforming to VDE 0670 and VDE 0432 list 2): 21 kV AC for 1 minute.

    b. Test Voltage Phase to Phase: 25 kV AC for 1 minute.

    c. Test Voltage Phase to Ground Short Circuit withstand capacity 16kA for 1 second.

2. Sockets shall also comply with the following:

    a. Contact resistance: 1 milli-ohm.

    b. Size of phase and earth pins shall be 12 mm in diameter.

    c. Size of pilots shall be 6 mm in diameter.

d. Phase cable terminals shall be compression type and detachable.

e. Pilot cable terminals shall be crimp or solder type.

f. Female contacts shall be fitted with internal slotted contact sleeve and the contact shall remain fully effective up to 392 degrees Fahrenheit. Pins and contacts shall be silver plated and built to DIN 57 670 specification.

g. The insulators shall be thermo plastics material type PPO and shall be interchangeable in the plug and socket body shells.

3. Stainless steel fiber optic junction box with pig-tails and 4 way multi-mode connectors shall be Cavotec Model 20134.

4. Mechanical interlocks (keyed per contract requirements) shall be Kirk Lock SD DM Model.

5. Module shall be easily removed for replacement or servicing.

6. Roller guide assemblies (assemblies) shall be fabricated to the dimensions in the plan documents and shall be Cavotec Model Number RG24. The assembly shall meet the following requirements:

   a. Roller shall be 90 Shore A, 4,100 pounds per square inch (psi) tensile strength, adiprene polyurethane cover over stainless steel core, designed for high load-bearing marine applications.

   b. Assemblies shall incorporate heavy-duty stainless steel brackets and hardware with 1 inch diameter stainless steel axle.

   c. Assemblies shall incorporate high-density, high lubricity, corrosion resistant delrin (acetal) bearings at each end.

   d. Assemblies shall incorporate heavy-duty stainless steel support bracket with roller and bearings, able to support 1,000 pounds, mounted to the berth wall.

   e. Assemblies shall incorporate hinged roller with hold-open feature and securing (closed position) latch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install shore power outlet connection box as shown on Drawings and in compliance with City of Los Angeles Electrical Code.

END OF SECTION

Section 26 08 02

ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION

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

B. Section 26 09 13 - Electrical Power Monitoring (EPM)

C. Section 26 13 31 - 15 kV Metal-Enclosed Switchgear

D. Section 26 13 36 - 15 kV Metal-Clad Switchgear

E. Section 26 13 37 - 38 kV Metal-Clad Switchgear

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 REQUIREMENTS

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. Electrical Power Monitoring (EPM) including but not limited to:

1. Remote devices for monitoring
2. Ship simulation
3. Control and protection
4. Device communication interface hardware
5. Inter-communication wiring
6. Servers
7. Personal computer workstations
8. Software
9. Programmable logic controllers (PLC)
10. Human machine interfaces (HMI)
11. Printers
12. Ancillary equipment

B. EPM shall utilize ethernet as the high-speed backbone network that supports direct connection of an unlimited number of personal computer workstations anywhere on the network.

C. Each server computer, or personal computer workstation (PCW) connected to the network shall have equal access to information provided by the power monitoring devices for centralizing data display, data logging, alarming, event recording, and other power monitoring operations. Each PCW shall be independent of the other PCWs with its own software and/or license to allow the user to retrieve and configure the information based on the user’s needs.

D. The high-speed network shall allow direct access to data provided by the power monitoring devices for implementing automatic control.

E. Application software for personal computer workstations shall be provided as described in Application Software, Software Licenses, and Components Article of this Section.

F. Refer to Manufacturer Article of this Section for requirements on manufacturers of EPM and other electrical products.

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 08 02 - Electrical Systems and Products Manufacturer's Certification, Quality Assurance, and Warranty Verification

C. Section 26 13 31 - 15 kV Metal-Enclosed Switchgear

D. Section 26 13 32 - 38 kV Metal-Enclosed LADWP Metering Switchgear

E. Section 26 13 36 - 15 kV Metal-Clad Switchgear

F. Section 26 13 37 - 38 kV Metal-Clad Switchgear

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 C12.20 - American National Standard for Electricity Meters - 0.1, 0.2, and 0.5 Accuracy Classes.

B. CEI EN 55011 - Industrial, Scientific and Medical Equipment – Radio-Frequency Disturbance Characteristics – Limits and Methods of Measurement.

C. CEI EN 55022 - Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement.

D. CEI EN IEC 61000-6-2 - Electromagnetic Compatibility (EMC) Part 6-2: Generic Standards - Immunity Standard for Industrial Environments.

E. CSA IEC 61000-4-15 - Electromagnetic Compatibility (EMC) - Part 4-15: Testing and Measurement Techniques - Flickermeter - Functional and Design Specifications.

F. CSA IEC 61000-4-30 - Electromagnetic Compatibility (EMC) - Part 4-30: Testing and Measurement Techniques - Power Quality Measurement Methods.

G. DIN EN 50160 - Voltage Characteristics of Electricity Supplied by Public Distribution Networks.

H. IEC 60950-1 - Information Technology Equipment – Safety - Part 1: General Requirements.

I. IEC 61850 - Communication Networks and Systems in Substations.

J. IEC 62053-22 - Electricity Metering Equipment - Particular Requirements - Part 22: Static Meters for AC Active Energy (Classes 0,1S,0,2S and 0,5S).

K. IEEE 519 - IEEE Standard for Harmonic Control in Electric Power Systems.

L. IEEE 802.3 - IEEE Standard for Ethernet.

M. IEEE 1453 - Recommended Practice for the Analysis of Fluctuating Installations on Power Systems.

N. ISO 9000 - Quality Management Systems -- Fundamentals and Vocabulary.

O. UL 508 - Industrial Control Equipment.

1.5 SUBMITTALS

A. Prior to submittal of shop drawings, submit to Engineer a sample of the proposed EPM including software system, Power Logic units, and other materials and components needed for a complete system, to demonstrate to Engineer that entire EPM complies with Specifications. The new system shall be fully compatible with existing Square D PowerLogic system installed and operating at Harbor Department Administration Building.

B. Upon Engineer’s acceptance of the proposed system sample, submit to Engineer for review shop drawings showing components, details, accessories, and manufacturer’s written instructions for EPM.

C. EPM manufacturer’s maintenance manuals and other submittals required in this Section. Provide manual in both hard copy and electronic file in PDF format.

D. Contractor shall submit to Engineer for review and approval copies of EPM system block diagram indicating connectivity method, showing the components, a complete component list with identification names and numbers listed, complete networking wiring diagram, EPM networking equipment, racks location, accessories and manufacturer's instructions for the installation and operation of EPM system and manufacturer's maintenance manuals, and software manual.

E. Submit proposed specific equipment mounting locations for approval by Engineer.

F. Product Data: Provide catalog sheets and technical data sheets to indicate physical data and electrical performance, electrical characteristics, and connection requirements of each device supplied under EPM scope of Work.

1.6 QUALITY ASSURANCE

A. Manufacturer shall be ISO 9000 registered to demonstrate quality compliance.

B. Manufacturer shall demonstrate that the system is not a prototype and that similar systems have been field installed and successfully operated for at least 5 years. EPM manufacturer and Contractor shall have full responsibility for ensuring that EPM performs as specified.

C. EPM installer shall be a Square D Certified PowerLogic Engineer with certificate of training and has accumulated 6 unit credits from PowerLogic University.

D. EPM system equipment, engineering, and commissioning services shall be from one manufacturer and shall be Underwriters Laboratories, Incorporated (UL) approved and shall bear UL label.

E. The system shall comply with the applicable portions of National Electrical Manufacturers Association (NEMA) standards. In addition, the control unit (PLC) shall comply with Federal Communications Commission (FCC) Emission Standards specified in Part 15, Subpart J for Class A application.

1.7 WARRANTY

A. Warrant EPM free parts and service for 1 year from the date of energization.

B. The manufacturer shall guarantee 12 months from date of installation that the equipment, and related hardware, software and the entire system shall be free of defects in design, manufacture, materials, and installation.

C. In the event a component fails to perform as specified, or is proven defective in service during the guarantee period, the manufacturer shall promptly replace the defective part at no additional cost to Department.

D. Contractor shall submit manufacturer's written agreement of the warranty. The warranty shall be in printed certificate form.

1.8 ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION

A. Provide a full-time PowerLogic priority telephone technical help center and a minimum of 2 on-site visits by Qualified Factory Application Engineer for customer for a period of 2 years after final acceptance by Department.

B. Provide a 3 day, on-site, instructor-led, training class for up to 10 Department staff. Training shall cover Fundamentals and Operations of Power SCADA Operation (PSO) and Power Monitoring Expert (PME), including basic hardware and software operation.

C. The energy monitoring system vendor shall make alterations and changes needed to make the system perform as needed at each location. Refer to ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION Section.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Entire EPM system shall be from 1 manufacturer and shall be UL approved and shall bear UL label. The manufacturer of the 15 kV metal-clad switchgear shall be the same manufacturer as the 15 kV metal-enclosed switchgear, the 5 kV metal-clad switchgear, low-voltage switchboards, medium-voltage transformer, and the power monitoring and control system.

B. Specified Manufacturer: Square D by Schneider Electric.

C. The manufacturer of the 15 kV metal-clad switchgear shall be the same manufacturer as the 15 kV metal-enclosed switchgear, 5kV metal-clad switchgear, low-voltage switchboards, medium-voltage transformer, and the power monitoring and control system.

2.2 POWER MONITORING DEVICE DESCRIPTIONS

A. Power Meters PM8244:

1. General Provisions:

a. Setup parameters required by the power meter shall be stored in nonvolatile memory and retained in the event of a control power interruption.

b. The power meter may be applied in 3-phase, 3- or 4-wire systems.

c. The power meter shall be applied at a nominal frequency of 60Hz.

d. Power meters shall be UL 508 Listed, Canadian Standards Association (CSA) approved, and have CE marking.

2. Measured Values:

a. The power meter shall provide the following, true root mean square (rms) metered quantities:

1) Real-Time Readings:

a) Current (per-phase, N (calculated), 3-phase average, percent unbalanced).

b) Voltage (L–L per-phase, L-L 3-phase average, L–N per phase, 3-phase average, percent unbalanced).

c) Real power (per-phase, 3-phase total).

d) Reactive power (per-phase, 3-phase total).

e) Apparent power (per-phase, 3-phase total).

f) Power factor (true) (per-phase, 3-phase total).

g) Power factor (displacement) (per-phase, 3-phase total).

h) Frequency.

i) THD (current and voltage).

2) Energy Readings:

a) Accumulated energy (real kWh, reactive kVARh, apparent kVAh) (signed/absolute).

b) Incremental energy (real kWh, reactive kVARh, apparent kVAh) (signed/absolute).

c) Conditional energy (real kWh, reactive kVARh, apparent kVAh) (signed/absolute).

d) Reactive energy by quadrant.

3) Demand Readings:

a) Demand current calculations (per-phase, 3-phase average, neutral):

1 Present.

2 Running average.

3 Last completed interval.

4 Peak.

b) Demand real power calculations (3-phase total):

1 Present.

2 Running Average.

3 Last completed interval.

4 Predicted.

5 Peak.

6 Coincident with peak kVA demand.

7 Coincident with kVAR demand.

c) Demand reactive power calculations (3-phase total):

1 Present Running Average.

2 Last completed interval.

3 Predicted.

4 Peak.

5 Coincident with peak kVA demand.

6 Coincident kW demand.

d) Demand apparent power calculations (3-phase total):

1 Present.

2 Running average.

3 Last completed interval.

4 Predicted.

5 Peak.

6 Coincident with peak kVA demand.

7 Coincident kW demand.

e) Average power factor calculations, demand coincident (true), (3-phase total):

1 Last completed interval.

2 Coincident with kW peak.

3 Coincident with kVAR peak.

4 Coincident with kVA peak.

f) Power Analysis Values:

1 THD – voltage, current (3-phase, per-phase, neutral).

2 Displacement power factor (per-phase, 3-phase).

3 Fundamental voltage, magnitude and angle (per-phase).

4 Fundamental currents, magnitude and angle (per-phase).

5 Fundamental real power (per-phase, 3-phase).

6 Fundamental reactive power (per-phase).

7 Harmonic power (per-phase, 3-phase).

8 Phase rotation.

9 Unbalance (current and voltage).

10 Harmonic magnitudes and angles for current and voltages (per phase) up to the 63rd harmonic.

3. Demand:

   a. Power demand calculations shall use any 1 of the following calculation methods, as selected by the user:

      1) Thermal demand using a sliding window updated every second for the present demand and at the end of the interval for the last interval. The window length shall be set by the user from 1-60 minutes in 1 minute increments.

      2) Block interval, with optional sub-intervals. The window length shall be set by the user from 1-60 minutes in 1 minute intervals. The user shall be able to set the sub-interval length from 1-60 minutes in 1 minute intervals. The following Block methods are available:

         a) Sliding block that calculates demand every second with intervals less than 15 minutes and every 15 seconds with an interval between 15 and 60 minutes.

         b) Fixed block that calculates demand at the end of the interval.

         c) Rolling Block that a subinterval is configured. Demand is calculated at the end of each subinterval and displays at the end of the interval.

      3) Demand can be calculated using a synchronization signal:

         a) Demand can be synchronized to an input pulse from an external source. The demand period begins with every pulse. A synchronized input can be configured to either a block or rolling block calculation.

         b) Demand can be synchronized to a communication signal. This can be configured to either a block or rolling block calculation.

c) Demand can be synchronized to the clock in the power meter.

4. Sampling:

   a. The current and voltage signals shall be digitally sampled at a rate high enough to provide true rms accuracy to the 63rd harmonic (fundamental of 60 Hz).

   b. The power meter shall provide continuous sampling at a minimum of up to 128 samples/cycle, simultaneously on the voltage and current channels in the meter.

5. Minimum and Maximum Values:

   a. The power meter shall provide monthly minimum and maximum values for the following parameters:

      1) Voltage L-L.

      2) Voltage L-N.

      3) Current per phase.

      4) Voltage L-L unbalance.

      5) Voltage L-N unbalance.

      6) True power factor.

      7) Displacement power factor.

      8) Real power total.

      9) Reactive power total.

      10) Apparent power total.

      11) THD voltage L-L.

      12) THD voltage L-N.

      13) THD current.

      14) Frequency.

b. For each minimum and maximum value listed above, the power meter shall record the following attributes:

1) Date/time of the minimum/maximum value.

2) Minimum/maximum value.

3) Phase of recorded minimum/maximum (for multi-phase quantities).

c. Minimum and maximum values shall be available via communications and display.

6. Harmonic Resolution:

a. Advanced harmonic information shall be available via the power meter. This shall include the calculation of the harmonic magnitudes and angles for each phase voltage and current through the 63rd harmonic.

b. Harmonic information shall be available for three phases, current and voltage, plus the residual current. To ensure maximum accuracy for analysis, the current and voltage information for each of the phases shall be obtained simultaneously from the same cycle.

c. The harmonic magnitude shall be reported as a percentage of the fundamental or as a percentage of the rms values, as selected by the user.

7. Current Inputs:

a. The power meter shall accept current inputs from standard instrument current transformers with 5 amperes (amps) secondary output and shall have a metering range of 0 to10 amps with the following withstand currents: 20 amps continuous, 50 amps 10 seconds per hour, 500 amps 1 second per hour.

b. Current transformer primaries through 32 kA shall be supported.

8. Voltage Inputs:

    a. Circuit monitor shall allow connection to circuits up to 600 volts AC without the use of potential transformers. The power meter shall also accept voltage inputs from standard instrument potential transformers with 120 volt secondary output. The power meter shall support PT primaries through 3.2 MV.

    b. The nominal full scale input of the circuit monitor shall be 347 volts AC L-N, 600 volts AC L-L. The meter shall accept a metering over-range of 50 percent. The input impedance shall be greater than 2 ohms.

9. Accuracy:

    a. The power meter shall comply with ANSI C12.20 Class 2 and IEC 62053-22 Class 2S for revenue meters.

    b. The power meter shall be accurate to 0.25 percent of reading plus 0.025 percent of full scale for power and energy. Voltage and current shall be accurate to 0.075 percent of reading plus 0.025 percent of full scale. Power factor metering shall be accurate to plus or minus 0.002 from 0.5 leading to 0.5 lagging. Frequency metering shall be accurate plus or minus 0.01 Hz at 45 to 67 Hz.

    c. These accuracies shall be maintained for both light and full loads. No annual calibration shall be required to maintain this accuracy.

10. Waveform Capture (for PM8244 Only):

    a. Power meter shall provide steady state waveform captures of the voltage and current channels. Waveform capture shall be for 3 cycles and is initiated manually using software.

    b. Power meter shall capture, and store in internal non-volatile memory, 128 digitally sampled data points for each cycle of each phase voltage. The number of waveform captures stored onboard the circuit monitor is configurable and shall be dependent on the amount of memory available.

    c. Power meter shall transmit the waveform samples over the network to the personal computer workstation for display, archival, and analysis.

    d. Harmonic analysis performed on the captured waveforms shall resolve harmonics through the 63rd.

e. The data used for the 3-cycle waveform capture display shall also be used to derive metered quantities in order to provide meaningful additional data.

f. Waveforms shall reflect actual circuit performance. Waveforms synthesized or composed over time shall not be acceptable.

g. Power meter shall have disturbance sag/swell detection for troubleshooting and solving anomalies.

h. Power meter shall have configurable waveform capture with flexible resolution permits to adapt the waveform captures according to the type of even/disturbance or channel.

11. Input/Output:

a. Power meter shall supply 1 digital input and 1 digital solid state output/KY pulse output as standard.

b. Power meter shall be capable of operating a solid state KY output relay to provide output pulses for a user definable increment of reported energy. Minimum relay life shall be in excess of one billion operations. The standard KY output shall operate up to 240 volt alternating current (AC), 300 volt direct current (DC), 96 milliamp max, and provide 3750 volt rms isolation.

c. Power meter shall support multiple input/output options including digital inputs and mechanical relay outputs. This optional input/output (I/O) shall be in the form of an option module that can be field installable.

d. The digital inputs shall have 3 operating modes:

1) Normal mode for simple on/off digital inputs.

2) Demand Interval Synch Pulse to accept a demand synch pulse from a utility demand meter.

3) Conditional Energy Control input to control conditional energy accumulation.

e. The optional relay output module shall provide a load voltage range from 20 to 240 VAC or from 20 to 30 VDC. It shall support a load current of 2A.

12. Output Relay Control:

    a. Relay outputs shall operate either by user command sent over the communication link, or in response to a user defined alarm or event.

    b. Output relays shall have normally open and normally closed contacts and can be configured to operate in several modes:

        1) Normal contact closure where the contacts change state for as long as the signal exists.

        2) Latched mode when the contacts change state when a pick-up signal is received and hold until a dropout signal is received.

        3) Timed mode when the contacts change state upon receipt of a pick-up signal and are held for a pre-programmed duration.

        4) End of power demand interval when the relay operates as a synch pulse for other devices.

        5) Energy pulse output. The relay shall pulse quantities used for absolute kWh, absolute kVARh, kVAh, kWh in, kVARh in, kWh out and kVARh out.

    c. It shall be possible for individual relay outputs to be controlled by multiple alarms using Boolean type logic.

13. Logging:

    a. Power meter shall provide for onboard data logging. Each power meter shall be able to log data, alarms and events, and waveforms. The meter shall offer on-board nonvolatile memory. Logged information to be stored in each power meter includes the following:

        1) Billing Log: Power meter shall store in non-volatile memory a configurable billing log that is updated every 15 minutes. Data shall be recorded by month, day and 15 minute interval. The log shall contain 24 months of monthly data, 32 days of daily data and between 2 to 52 days of 15 minute interval data depending on the number of quantities selected.

2) Custom Data Logs: Power meter shall provide 1 data log or up to 3 separate data logs, configurable by the user. Each log entry shall be date and time stamped to the second. Each log entry shall hold data of up to 96 parameters each. It shall be possible to set up each log to take data at a different user defined schedule interval. In addition, it shall be possible for a user to define an event. Data logs can be configured by users to be fill and hold or first in first out (FIFO).

3) Alarm Log: This log shall contain time, date, event information, and coincident information for each user defined alarm or event.

4) Waveform Logs: This log shall store captured waveforms. Waveform logs shall be either fill and hold or circular (first in first out) as defined by the user.

b. Power meter shall have default values for logs loaded at the factory and begin on device power up.

14. Alarming:

a. Alarm events shall be user definable.

b. The user shall be able to define over 50 alarm conditions.

c. The following shall be available as alarm events:

1) Over/under current.

2) Over/under voltage.

3) Current imbalance.

4) Phase loss, current.

5) Phase loss, voltage.

6) Voltage imbalance.

7) Over kW Demand.

8) Phase reversal.

9) Digital Input off/on.

10) End of incremental energy interval.

11) End of demand interval.

d. For each over/under metered value alarm, the user shall be able to define a pick-up, drop-out, and delay.

e. There shall be 4 alarm severity levels in order make it easier for the user to respond to the most important events first.

f. Indication of an alarm condition shall be given on the front panel.

g. Power meter shall provide Boolean alarms in the form of combining up to 4 other alarms with NAND, NOT, OR, and XOR.

15. Output Relay Control:

a. Relay outputs shall operate either by user command sent over the communication link, or set to operate in response to user defined alarm event.

b. Output relays shall close in either a momentary or latched mode as defined by the user.

c. Each output relay used in a momentary contact mode shall have an independent timer that can be set by the user.

d. It shall be possible for individual relay outputs to be controlled by multiple alarms using Boolean type logic.

16. Feature Addition:

a. It shall be possible to field upgrade the firmware in the power meter to enhance functionality. These firmware upgrades shall be done through the communication connection and shall allow upgrades of individual meters or groups. No disassembly or changing of integrated circuit chips shall be required and it shall not be necessary to de-energize the circuit or the equipment to perform the upgrade.

17. Control Power:

a. Power meter shall operate properly over a wide range of control power including 90-457 VAC or 100-300 VDC.

18. Communications:

a. Power meter shall communicate via RS-485 Modbus or Jbus protocol with a 2-wire connection.

b. Using the meter's built-in ethernet ports, the power meter shall provide Modbus communications using Modbus TCP via an ethernet network at 10/100Mbaud using UTP category 6 connection.

19. Display:

a. Power meter display shall allow the user to select one of three languages to view on the screen: English, French, or Spanish. The power meter display shall also allow the user to select a date/time format.

b. Power meter display shall be backlit LCD for easy viewing, display shall also be anti-glare and scratch resistant.

c. Display shall be capable of allowing the user to view 4 values on one screen at the same time. A summary screen shall also be available to allow the user to view a snapshot of the system.

d. Power meter display shall provide local access to the following metered quantities:

1) Current, per phase rms, 3-phase average and neutral (if applicable).

2) Voltage, phase-to-phase, phase-to-neutral, and 3-phase average (phase-to-phase and phase-to-neutral).

3) Real power, per phase and 3-phase total.

4) Reactive power, per phase and 3-phase total.

5) Apparent power, per phase and 3-phase total.

6) Power factor, 3-phase total and per phase.

7) Frequency.

8) Demand current, per phase and 3 phase average.

9) Demand real power, 3 phase total.

10) Demand apparent power, 3 phase total.

11) Accumulated Energy, (MWh and MVARh).

12) THD, current and voltage, per phase.

e. Reset of the following electrical parameters shall also be allowed from the power meter display:

1) Peak demand current.

2) Peak demand power (kW) and peak demand apparent power (kVA).

3) Energy (MWh) and reactive energy (MVARh).

f. Setup for system requirements shall be allowed from the power meter display. Setup provisions shall include:

1) CT rating.

2) PT rating.

3) System type [3-phase, 3-wire] [3-phase, 4-wire].

4) Watt-hours per pulse.

g. The power meter shall be a PM5563 or PM8244 series as indicated on Drawings, and manufactured by Square D Company.

B. Circuit Monitor ION9000T:

1. Circuit monitors shall be UL 508 listed, CSA approved, and have CE marking.

2. Measured Values:

a. The following metered values shall be measured by circuit monitor. In addition, circuit monitor shall record and save in nonvolatile memory the minimum and maximum values of the listed values since last reset. Circuit monitor shall also record and save in nonvolatile memory the interval minimum, maximum, and average of any of the values pre-defined over a user specified interval.

1) Real-Time Readings:

a) Current (per-phase, N, G, 3-phase average, apparent rms, percent unbalanced).

b) Voltage (L–L per-phase, L-L 3-phase average, L–N per-phase, 3-phase average, neutral to ground, percent unbalanced).

c) Real power (per-phase, 3-phase total).

d) Reactive power (per-phase, 3-phase total).

e) Apparent power (per-phase, 3-phase total).

f) Power factor (true)(per-phase, 3-phase total).

g) Power factor (displacement)(per-phase, 3-phase total).

h) Frequency.

i) Temperature (internal ambient).

j) THD (current and voltage).

k) K-factor (per-phase).

2) Energy Readings:

a) Accumulated energy (real kWh, reactive kVARh, apparent kVAh) (signed/absolute).

b) Incremental energy (real kWh, reactive kVARh, apparent kVAh) (signed/absolute).

c) Conditional energy (real kWh, reactive kVARh, apparent kVAh) (signed/absolute).

d) Reactive Energy by Quadrant.

3) Demand Readings:

a) Demand current (per-phase present, 3-phase average, neutral):

1 Last complete interval.

2 Peak.

b) Demand voltage (L-N, L-L, per-phase, 3-phase average):

1 Last complete interval.

2 Minimum.

3 Peak.

4) Average power factor (true), (3-phase total):
    a) Last complete interval.
    b) Coincident with kW peak.
    c) Coincident with kVAR peak.
    d) Coincident with kVA peak.
5) Demand real power (3-phase total):
    a) Last complete interval.
    b) Predicted.
    c) Peak.
    d) Coincident kVA Demand.
    e) Coincident kVAR Demand.
6) Demand reactive power (3-phase total):
    a) Last complete interval.
    b) Predicted.
    c) Peak.
    d) Coincident kVA demand.
    e) Coincident kW demand.
7) Demand apparent power (3-phase total):
    a) Last complete interval.
    b) Predicted.
    c) Peak.
    d) Coincident kVA demand.
    e) Coincident kW demand.
8) Power Analysis Values:
    a) THD–voltage, current (3-phase, per-phase, neutral).

b) Total demand distortion.

c) K-factor (per-phase).

d) Crest factor (per-phase).

e) Displacement power factor (per-phase, 3-phase).

f) Fundamental voltage, magnitude and angle (per-phase).

g) Fundamental currents, magnitude and angle (per-phase).

h) Fundamental real power (per-phase, 3-phase).

i) Fundamental reactive power (per-phase).

j) Harmonic power (per-phase, 3-phase).

k) Phase rotation.

l) Unbalance (current and voltage).

m) Harmonic magnitudes, and angles (per-phase).

n) Distortion power.

o) Distortion power factor.

b. The current and voltage signals shall be digitally sampled at a rate high enough to provide true rms accuracy to the 255th harmonic (based on fundamental of 50/60 Hz).

c. The following metered values as well as the minimum and maximum instantaneous readings since last reset shall be communicated by the circuit monitor:

1) Frequency.

2) Temperature.

3) Current, per phase rms and neutral (if applicable).

4) Current, 3-phase average rms.

5) Current, apparent rms.

6) Voltage, phase-to-phase and phase-to-neutral.

7) Voltage unbalance, phase-to-phase and phase-to-neutral.

8) Power factor, per phase.

9) Power factor, 3-phase total.

10) Real power, per phase and 3-phase total.

11) Reactive power, per phase and 3-phase total.

12) Apparent power, per phase and 3-phase total.

13) Demand current, per phase and 3-phase average.

14) Demand real power, 3-phase average.

15) Demand reactive power, 3-phase average.

16) Demand apparent power, 3-phase average.

17) Accumulated energy, (MWh, MVAH, and MVARh).

18) Reactive energy, (VARh by quadrant).

19) Total harmonic distortion (THD), voltage and current, per phase.

20) K-factor, per phase.

3. Demand:

a. Power demand calculations shall be done by any 1 of the following calculation methods, as selected by the user:

1) Thermal demand is calculated using a sliding window and is updated every second. The sliding window length shall be defined by the user from 1 to 60 minutes, with 1-minute increments.

2) Block interval, with optional sub-intervals. The window length shall be set by the user from 1 to 60 minutes in 1-minute intervals. The user shall be able to set the sub-interval length from 1 to 30 minutes in 1-minute intervals.

3) External pulse synchronization, utilizing a synch pulse provided externally. An optional status input shall be used to sense the pulse.

4) Sliding block interval with continuous sliding 1 second subintervals.

b. The default demand calculation method shall be a 15-minute continuous sliding block.

c. The following demand readings shall be reported by the circuit monitor:

1) Average demand current, per phase.

2) Peak demand current, per phase.

3) Average demand for real power, reactive power, and apparent power.

4) Predicted demand for real power, reactive power, and apparent power.

5) Peak demand for real power, reactive power, and apparent power.

d. Circuit monitor shall also provide a generic demand capability to provide demand calculation on any metered parameter.

e. Each circuit monitor shall be capable of receiving a broadcast message over the communications network that can be used to synchronize demand calculations by several circuit monitors. This message need not be addressed specifically to any one circuit monitor.

4. Sampling:

a. Current and voltage signals shall be digitally sampled at a rate high enough to provide true root mean square (rms) accuracy to the 255th harmonic (fundamental of 60 Hz).

b. ION9000T: Circuit monitor shall have a 5 MHz per channel (167,000 points per cycle at 60 Hz or 200,000 points per cycle at 50 Hz) sampling rate.

5. Harmonics:

a. Advanced harmonic information shall be available via the circuit monitor. This shall include the calculation of the harmonic magnitudes and angles for each phase voltage and current through the 255th harmonic.

b. This information shall be available for 3 phases, current and voltage, plus the neutral current. To ensure maximum accuracy for analysis, the current and voltage information for the phases shall be obtained simultaneously from the same cycle.

c. Circuit monitor shall have a minimum of 16k of on board memory to log harmonic magnitudes and angles.

d. The harmonic magnitude shall be reported as a percentage of the fundamental or as a percentage of any circuit monitor may be applied in 3-phase, 3- or 4-wire systems. A fourth CT input shall be available to measure neutral or ground current. If the fourth CT is not used, then a residual current shall be calculated by vectoral addition of the phase currents. In 4-wire connections, the circuit monitor shall utilize the circuit neutral common reference and not earth ground, to provide metering accuracy.

e. Harmonic power flows shall be provided up to the 41st harmonic for real, reactive, and apparent power.

6. Transients:

a. Circuit monitor shall be able to detect and capture transients up to 10,000 Vpeak line to line with a duration as short as 200 nanoseconds when equipped with a Transient Module.

7. Flicker:

a. Circuit monitor shall detect and measure the flicker (50Hz or 60 Hz) of an electrical system based on CSA IEC 61000-4-15 (or IEEE 1453) when equipped with a Transient Module.

b. Circuit monitor shall measure 3 levels of flicker:

1) Instantaneous.

2) Short-term.

3) Long-term.

c. The user shall have the ability to view the graphical time-trend of Flicker magnitude in a semi-logarithmic format when equipped with a communications card.

8. DIN EN 50160 Evaluation:

    a. Circuit monitor shall include DIN EN 50160 evaluations. This capability is characterized by the evaluation of certain power quality parameters: frequency, magnitude of the supply voltage, supply voltage variations, rapid voltage changes, supply voltage dips, short interruptions of the supply voltage, long interruptions of the supply voltage, temporary power frequency overvoltages, transient overvoltages, supply voltage unbalance, and harmonic voltage.

    b. Circuit monitor shall be capable of reporting DIN EN 50160 evaluation data in the following formats: summary of active evaluations, summary of evaluation status, detailed information for each evaluated parameter, detailed information for each abnormal event.

    c. The user shall be able to reset DIN EN 50160 evaluations statistics as required.

9. Accuracy:

    a. Circuit monitors shall accept metering inputs of up to 600Vac direct connection or from industry standard instrument transformers (120 VAC secondary PTs and 5 A secondary CTs). Connection to 480Y/277 VAC circuits shall be possible without use of PTs.

    b. PT primaries through 1.2 MV shall be supported.

    c. CT primaries through 32 kA shall be supported.

    d. Circuit monitor shall be accurate to 0.04 percent of reading plus/minus 0.025 percent of full scale for voltage and current metering and 0.08 percent of reading plus 0.025 percent for power.

    e. The circuit monitor’s energy readings shall meet the revenue accuracy requirements of ANSI C12.20 0.1 class and IEC 62053-22 0.1S class metering.

    f. No annual re-calibration by users shall be required to maintain published accuracy.

    g. Voltage and current for the phases shall be sampled simultaneously to assure high accuracy in conditions of low power factor or large waveform distortions (harmonics).

10. Waveform Capture:

    a. Circuit monitors shall include current and voltage waveform capture capability. Waveform capture shall be user selectable for 16 to 1,024 samples per cycle or can be user specified up to 30 seconds.

    b. Waveform capture shall be initiated either from a personal computer workstation (PCW) running Power Monitoring and Control Systems software or by the circuit monitor as a user defined response to an alarm condition.

    c. Waveform capture manually triggered from Power Monitoring and Control System software shall be captured at 1,024 samples per cycle for one cycle providing harmonic content up to the 255th harmonic for Ia, Ib, Ic, I4, Va, Vb, Vc, Vg.

    d. Three types of waveform capture shall be available for response to an alarm condition:

        1) Steady state shall be manually initiated and provide a resolution of 1,024 samples per cycle.

        2) Disturbance shall be initiated manually or by an alarm condition and allow the user to select a resolution of 16 to 1,024 samples per cycle and a duration of 915 to 1 cycle.

        3) Adaptive shall be initiated manually or by an alarm condition and allow the user to select a resolution of 16 to 1,024 samples per cycle and a duration of 1320 to 1 second.

    e. Circuit monitor shall transmit the waveform samples over the network to the personal computer workstation for display, archival, and analysis.

    f. Each voltage and current of the phases shall be sampled concurrently so that proper phase relationships are maintained, so that harmonic flow analysis can be performed, and so that the effect of a disturbance can be observed on the phase voltages and currents.

    g. Harmonic analysis performed on the captured waveforms shall resolve harmonics through the 255th using Power Monitoring and Control Software.

h. Waveforms shall reflect actual circuit performance. Waveforms synthesized or composed over time shall not be acceptable.

11. Logging:

a. Data logging may be accomplished either within the circuit monitor or at PC Workstation, or both. Each circuit monitor shall be able to log data, alarms and events, and multiple waveforms. The monitors shall contain a minimum of 2,000MB of on-board nonvolatile memory, which can be field upgraded without requiring disassembly or removal the circuit monitor. On board data logs shall be communicated to PC Workstation upon demand or at scheduled intervals. Logged information to be stored in each circuit monitor includes:

1) Up to 14 separate data logs shall be configurable by the user. Each log entry shall be date and time stamped. The type of data for the log shall be selected from a list of over 150 monitored values. Each log entry shall be user configurable to consist of from one to over 75 values of instantaneous data. It shall be possible to set up each log to record data at independent user defined intervals. In addition, it shall be possible for a user to define an event or new minimum/maximum condition that shall trigger log file entries.

2) Data logs can be configured by users to be fill and hold or circular (FIFO).

3) A minimum/maximum log file shall include the time, date, and value for the minimum and maximum of each of the instantaneous metered values since last reset. As well as a minimum/maximum/average log that records the minimum/maximum/average readings for pre-defined quantities at a user-specified interval.

4) An alarm and event log shall contain time, date, event information, and coincident information for each user defined alarm or event. This log shall have a capacity of up to 1,000 events.

5) Waveform logs shall store captured waveforms as defined by the user. Waveform log entries shall be scheduled at user defined interval, externally triggered, or forced in response to a user defined event. Waveform logs shall be either fill and hold or circular (FIFO) as defined by the user.

6) PowerLogic monitoring and control system software shall be available to enable the user to allocate onboard circuit monitor memory for each logging function.

12. Alarming:

a. Alarm events shall be a combination of pre-configured from the factory events and user definable events. Multiple levels of alarms can be configured for each metered parameter.

b. The following classes of events shall be available as alarm events:

1) Over/under current.

2) Over/under voltage.

3) Current imbalance.

4) Phase loss, current.

5) Phase loss, voltage.

6) Wave Shape Alarm.

7) Voltage imbalance.

8) Over kVA.

9) Over kW or kVAR into/out of load.

10) Over/under frequency.

11) Under power factor, true or displacement.

12) Over THD.

13) Over K-factor.

14) Over demand, current or power.

15) Reverse power.

16) Phase reversal.

17) Status Input change.

18) End of incremental energy interval.

19) End of demand interval.

20) Over/under analog inputs.

21) Current sag/swell.

22) Voltage sag/swell.

23) Transients (ION9000T).

c. For each over/under metered value alarm, the user shall be able to define a pick-up, drop-out, and delay.

d. The user shall have the ability to alarm using a Waveshape Alarm feature based on user set thresholds by defining the following parameters:

1) Phase voltage.

2) Neutral ground voltage.

3) Phase current.

4) Neutral current.

e. There shall be 4 alarm severity levels in order make it easier for the user to respond to the most important events first.

f. Indication of an alarm condition shall be given on the local display as well as reported to the power monitoring and control system software.

g. The circuit monitor shall calculate key electrical parameters at 100ms intervals for the purpose of alarming and recording of data during an event. The recorded data shall be comprised of rms readings for I, V, kW, kVAR, kVA, and True PF. 1 to 10 seconds of pre-event and up to 5 minutes of post event data can be recorded.

13. Waveshape Alarm:

a. Circuit monitor shall include waveshape alarm capability. This capability is characterized by the following features:

1) Circuit monitor shall be capable of continuously monitoring waveform anomalies in the following:

a) Phase voltages.

b) Neutral to ground voltages.

c) Phase currents.

d) Neutral currents.

b. Anomalous waveshape events less than 1/2 cycle in length shall be detected.

c. User shall be able to set a threshold value and upper limit in the circuit monitor to determine if a waveshape event has occurred. The threshold and upper limit shall be user-defined values between 0 to 100. The threshold value is the limit at which a waveshape alarm shall trigger. The upper limit defines the highest waveshape value that shall trigger a waveshape alarm.

d. Upon detecting a disturbance, the circuit monitor shall be capable of:

1) Logging a waveform of the event of the phase currents and voltages and/or a high-speed 100 milliseconds rms event recording.

2) Recording the disturbance into an event log with a date and time stamp to the millisecond.

3) Causing an operator alarm at PC workstation.

4) Determining the source of the disturbance (upstream or downstream from the meter) and a statistical level of confidence (low, medium, high) of the accuracy of the source location.

14. Communications:

a. Circuit monitor shall communicate via RS-232, RS-485, and ethernet simultaneously.

b. Circuit monitor shall provide Modbus communications using Modbus TCP via an ethernet network at 10/100Mbaud using UTP or fiber connections. Circuit monitor shall provide the capability to communicate to 31 additional Modbus devices existing on RS-485 daisy chains and report data back to EPM application software or across the ethernet network to other software applications.

c. Circuit monitor display shall provide an RS-232 communications port on board the metering module as well as an IR RS-232 communications port located on the display. The display port shall be completely accessible during normal operation and shall not require exposure of the operator to life-threatening voltage when in use. The operator shall be able to quickly connect a small personal computer (PC) to either the module port or the display port without use of tools or splices. Both the metering module port and the display port shall have the communication functionality of the standard hard-wired port. When a connection is made to either the metering module port or the display port, the circuit monitor shall continue simultaneous operation of the communication ports associated with the circuit monitor.

d. It shall be possible to field upgrade the firmware in the circuit monitor to enhance functionality. These firmware upgrades shall be done through either the display port or communication connection. No circuit monitor disassembly or changing of integrated circuit chips shall be required. It shall not be necessary to de-energize the circuit or the equipment to upgrade the firmware.

e. Circuit monitor shall allow communication to the ports simultaneously.

f. Circuit monitor shall have the option to serve data over the ethernet network accessible through a standard web browser. Information shall be available from the circuit monitor and from Modbus slave devices connected downstream from the monitor. The monitor shall contain default pages from the factory and also have the ability for the user to create custom pages as needed.

g. Circuit monitor shall provide e-mail notification of any alarm condition that it detects.

h. Time synchronization to 1 millisecond between monitors via GPS synchronization.

15. Input/Output (I/O) Options:

a. Circuit monitor input/output options: input/output options/modules shall be field replaceable. Circuit monitors shall provide pre-configured I/O options and also provide I/O options to be configured as applicable to each installation as shown on Drawings:

1) 1- solid state output suitable for KYZ pulse initiation; 4-solid state status inputs; 3-(10A) mechanical output relays.

2) 4 solid state status inputs; 4-analog inputs (4-20 mA).

3) 4-inputs (32Vdc); 2-solid state outputs (60Vdc); 1-analog input (0-5Vdc); 1-analog output (4-20mA).

4) 8-solid state status inputs (120Vac).

5) Circuit monitor shall provide configurable I/O options to include solid state input modules for 120Vac, 200Vac, and 32Vdc; solid state outputs modules for 120Vac, 240Vac, 60Vdc, 240Vdc; analog input modules for 0-5Vdc, 4-20mA; analog output module for 4-20mA.

16. Output Relay Control:

    a. Relay outputs shall operate either by user command sent over the communication link, or set to operate in response to user defined alarm event.

    b. Output relays shall close in either a momentary or latched mode as defined by the user.

    c. Each output relay used in a momentary contact mode shall have an independent timer that can be set by the user.

    d. It shall be possible for individual relay outputs to be controlled by multiple alarms in a wired "OR" configuration.

17. Disturbance Detection:

    a. Circuit monitors noted on Drawings shall include sag and swell detection capability. This capability is characterized by the following features:

        1) Circuit monitor shall continuously monitor for disturbances in the currents and incoming voltage. There shall be zero blind time; each cycle shall be individually monitored.

        2) Disturbance events less than 1/2 cycle in length shall be detected.

3) The user shall be able to set a threshold and delay which shall be used by the circuit monitor to determine if an event has occurred. The threshold shall be user defined as either a fixed set point or relative set point. When using the relative set point, circuit monitor shall set the nominal current or voltage equal to its present average value. Circuit monitor shall automatically adjust the nominal current and voltage values to avoid nuisance alarms caused by gradual daily variations of currents and voltages.

b. Upon detecting a disturbance, the circuit monitor shall be capable of:

1) Logging a waveform of the event phase currents and voltages and/or a high-speed 100ms RMS event recording.

2) Operating any output relay on an optional I/O module.

3) Recording the disturbance into an event log with a date and time stamp to the millisecond.

4) Determining the direction of the cause of disturbance and categorize as “Upstream” from the meter or “Downstream” from the meter with an assigned confidence factor in the algorithm, then annunciate this determination through software.

5) Causing an operator alarm at PCW workstation.

c. The user shall have the ability to display the voltage sag/swell events on Information Technology Industry Council (ITIC) or Semiconductor Equipment and Materials Institute (SEMI) graphs to quantify the event with respect to accepted industry standards. If so desired the user shall also have the ability to view this information on custom web pages over the Internet when used with a communications card.

d. Data and waveform logs shall be communicated over the local area network or through the front panel communications port so that the user may view and analyze the data using EPM software and workstation.

e. The location of the source of the disturbance (upstream or downstream from the meter) shall be provided for each event. A statistical level of confidence (low, medium, high) of the accuracy of the source’s location shall be provided.

18. Display:

    a. Circuit monitor display shall allow the user to select 1 of 3 languages to view on the screen:

        1) English.

        2) French.

        3) Spanish.

    b. Circuit monitor display shall also allow the user to select a date/time format and the ability to create additional screens for user-specified views and/or custom quantities without overwriting existing standard screens.

    c. Circuit monitor display shall provide local access to the following metered quantities as well as the minimum and maximum value of each instantaneous quantity since last reset of minimum/maximum:

        1) Current, per phase rms, 3-phase average and neutral (if applicable).

        2) Voltage, phase-to-phase, phase-to-neutral, and 3-phase average (phase-to-phase and phase-to-neutral).

        3) Real power, per phase and 3-phase total.

        4) Reactive power, per phase and 3-phase total.

        5) Apparent power, per phase and 3-phase total.

        6) Power factor, 3-phase total and per phase.

        7) Frequency.

        8) Demand current, per phase and 3-phase average.

        9) Demand real power, 3-phase total.

        10) Demand apparent power, 3-phase total.

        11) Accumulated Energy, (MWh and MVARh).

        12) THD, current and voltage, per phase.

        13) K-factor, current, per phase.

d. Reset of the following electrical parameters shall also be allowed from the circuit monitor display:

1) Peak demand current.

2) Peak demand power (kW) and peak demand apparent power (kVA).

3) Energy (MWh) and reactive energy (MVARh).

4) Setup for system requirements shall be allowed from the circuit monitor display. Setup provisions shall include:

a) CT rating.

b) PT rating.

c) System type [3-phase, 3-wire].

d) Demand interval (5 to 60 minutes).

e) Watt-hours per pulse.

e. For ease in operator viewing, two displays are offered for local viewing of circuit monitor data. The liquid crystal display (LCD) shall include back lighting. The enhanced vacuum fluorescent display (VFD) shall be automatically activated by a proximity sensor as the operator approaches.

19. Programming:

a. Where indicated on Drawings, circuit monitors shall be designed to run customized programs to greatly expand circuit monitor’s functionality for the particular installation.

b. These programs shall be written in a circuit monitor programming language similar to a compiled “BASIC” language. It shall include the following capabilities:

1) Scheduled tasks.

2) Event Tasks.

3) Math functions including: add, subtract, multiple, divide, sine, cosine, square root, and the like.

4) Logical functions including: AND, OR, XOR, NOT, shift, and the like.

5) Loop commands.

6) Compare statements.

7) Counters and timers.

c. Circuit monitor manufacturer shall offer custom programming services.

d. Changing programs shall not require any physical modifications to the circuit monitor, such as changing computer chips or cards. Changes shall be done via either of the communications ports.

e. Examples of custom programs would include:

1) Metering of specialized utility rate structures, including real time pricing and curtailable rates.

2) Data reduction using smart data logging.

3) Automatic monthly logging/reset of kWh and Peak Demand.

4) Statistical profile analysis of metered quantities.

5) ITIC/SEMI power quality analysis.

6) Calculations for IEEE 519 verification.

7) Metering of combined utilities: gas, water, steam, electric.

8) Non-critical control schemes, such as load control or power factor correction, based on multiple conditions e.g. time of day and input status.

20. Current/Voltage Inputs:

a. Circuit monitors shall accept metering inputs of up to 600Vac direct connection or from industry standard instrument transformers (120 VAC secondary PTs and 5 A secondary CTs). Connection to 480Y/277 VAC circuits shall be possible without use of PTs.

b. PT primaries through 1.2 MV shall be supported.

c. CT primaries through 32 kA shall be supported.

d. Circuit monitor shall be accurate to 0.04 percent of reading plus/minus 0.025 percent of full scale for voltage and current metering and 0.08 percent of reading plus 0.025 percent for power.

e. Circuit Monitor's energy readings shall meet the revenue accuracy requirements of ANSI C12.20 0.2 class metering.

f. No annual re-calibration by users shall be required to maintain published accuracy.

21. Feature Additions:

    a. It shall be possible to field upgrade the firmware in the circuit monitor to enhance functionality. These firmware upgrades shall be done through the communication connection and shall allow upgrades of individual meters or groups. No disassembly or changing of integrated circuit chips shall be required and it shall not be necessary to de-energize the circuit or the equipment to perform the upgrade.

    b. Circuit monitors shall be rated for an operating temperature range of minus 25 degrees C to 70 degrees C and have an over current withstand rating of 500 amps for 1 second.

    c. All setup parameters required by the circuit monitors shall be stored in nonvolatile memory and retained in the event of a control power interruption.

    d. Circuit monitor shall be capable of being applied without modification at nominal frequencies of 50, 60, or 400 Hz.

22. Circuit monitor shall operate properly over a wide range of control power including 100-305 VAC or 100-300 VDC. Connections to 18-60 VDC shall also be available.

23. Ride through capability shall be available for backup control power for up to 2 seconds, the rms values, as selected by the user.

24. Circuit monitor shall provide a hardware security switch to protect revenue related metering configuration from unauthorized/accidental changes. Circuit monitor shall support the use of a wire seal to further deter inadvertent configuration changes and provide visual tamper indication.

25. Circuit monitor shall be a PowerLogic ION9000T as indicated on Drawings, and manufactured by Square D Company.

C. Molded Case Circuit Breaker Electronic Trip Units:

1. Electronic trip units shall be provided as designated on Drawings. Electronic trip units shall be UL listed.

2. Electronic trip units shall be Square D Micrologic 6.0P, power trip units or energy trip units, where applicable, with Modbus RS-485 communications capability, as a minimum standard.

3. Electronic trip units shall provide the following breaker/trip unit information to EPM network:

   a. Breaker frame type (i.e. L-, P-, and R- Frames).

   b. Breaker sensor rating.

   c. Rating plug.

   d. Protective settings.

4. Electronic trip units shall provide individual phase and ground ammeter information to EPM network.

5. Electronic trip units shall provide the following trip information to EPM network:

   a. Date/time of last trip.

   b. Type of last trip (overload, short circuit, ground fault).

   c. Magnitude of phase and ground fault at time of last trip.

6. Electronic trip units shall provide the following maintenance information to EPM network:

   a. Number of overload trips.

   b. Number of short circuit trips.

   c. Number of ground fault trips.

D. Low Voltage Power Circuit Breaker Trip Units:

1. Each circuit breaker shall have power monitoring capabilities as specified below. Trip units alone or trip units in combination with meter modules can be used. Meter modules, if used, shall comply with applicable parts of this specification.

2. Electronic trip unit shall be UL listed as field-replaceable and upgradeable without special adjustments to the mechanism.
3. Electronic trip units shall be Square D Micrologic X, power trip units with Modbus RS-485 communications capability, as a minimum standard.
4. Electronic trip units shall provide the following breaker/trip unit information to EPM network:
    a. Breaker frame type (NT-, NW- and MTZ frames).
    b. Breaker sensor rating.
    c. Rating plug.
    d. Protective settings.
5. Electronic trip unit shall be true RMS current sensing.
6. Trip unit shall provide local trip indication and capability to indicate local and remote reason for trip, i.e., overload, short circuit or ground fault.
7. Each circuit breaker shall provide real time metering. Metering functions include:
    a. Current: Per phase, neutral, ground fault, earth leakage, 3-phase maximum, and fault. A loading capacity as a percent of the rating shall also be calculated.
    b. Voltage: Per phase and between phases. Voltage imbalance shall also be metered.
    c. Power: 3-phase total real, reactive, and apparent power.
    d. Energy: Apparent energy, real energy, and reactive energy.
    e. Demand:
        1) Current: Actual and predicted.
        2) Real power: Actual, predicted, and peak.
        3) Apparent power: Actual, predicted, and peak.
        4) Reactive: Actual, predicted, and peak.
    f. Frequency.

g. Accuracy: Power and energy readings shall be accurate to 2.5 percent of reading.

8. Trip units shall provide protective function and trip information including:

a. Circuit breaker frame size and rating.

b. Trip settings.

c. Cause of trip.

d. Device status: open, closed or tripped.

e. Breaker position status: racked in, racked out, test position.

f. Number of mechanical operations.

9. The trip unit shall include an integral, graphical display to indicate the following:

a. Metered values (numeric).

b. Per phase metered values by bar chart.

c. Trip settings.

10. Trip units shall be powered from within the circuit breaker without the need for an external power source.

E. Transformer Temperature Monitors:

1. Transformer temperature monitors shall be provided for each dry-type and cast resin transformer noted on Drawings. Transformer temperature monitors shall be UL Listed. Provide Square D Model 98A Transformer Temperature Monitor with Modbus RS-485 communications.

2. Transformer temperature monitors shall provide the following information to EPM network:

a. Coil Temperatures: Phases A, B, and C.

b. Hottest coil temperature.

c. Fan relay status.

d. Alarm relay status.

e. Emergency over-temperature relay status.

f. Set points for fans, alarm and over-temperature relays.

F. Digital Protective Relays:

1. Digital protective relays shall be installed as noted on Drawings. These relays shall accept 3-phase inputs from industry standard current transformers with 1 or 5 Amp nominal secondaries. Provide Square D Easergy P5F30 relays (refer to 15 kV METAL-CLAD SWITCHGEAR, 15 kV METAL-ENCLOSED SWITCHGEAR, 5kV METAL-CLAD SWITCHGEAR, and 38kV METAL-CLAD SWITCHGEAR Sections) with LCD display and Modbus RS-485 communications, or as indicated on Drawings.

2. The protective relay shall provide 3-phase overcurrent protection (ANSI 50/51) and ground overcurrent protection (ANSI 50/51G or 50/51N).

3. The user shall be able to select a variety of time current curves from several different families. Families of curves shall include definite time, inverse, very inverse, extremely inverse, and ultra inverse. Families of curves shall be suitable for coordination in typical medium voltage applications; the ultra inverse curves shall be provided to enhance coordination with fuses.

4. Provide a front panel keypad and display. From this front panel it shall be possible to:

   a. Select Time-Current Characteristic curves.

   b. Set CT ratios.

   c. Display phase current information.

   d. Observe Digital Relay trip status.

   e. Gather diagnostic information about the relay.

   f. View cause of trip.

5. An optional communication port shall be factory available. Over the communications provided by this port it shall be possible to:

   a. Serial communicate at up to 19.2 k baud over EPM network.

   b. Ethernet communications up to 10/100 Mpbs over EMP network.

   c. Operate the breaker by command.

d. Communicate instantaneous rms currents per phase and ground and demand currents per phase to EPM software.

e. Communicate breaker status, and type of trip including fault magnitude to EPM software.

f. Communicate the digital relay settings EPM software.

6. There shall be 2 options for control power for the relay:

a. Option 1: 120 VAC.

b. Option 2: 48/125 VDC.

7. Digital protective relays shall be UL listed.

G. EPM Serial Communications Network:

1. Connecting and Networking of RS-485 serial communications Power Monitoring Devices. These are devices which are non-ethernet-ready, such as PowerLogic relays, power meters, model 98A temperature monitors, Micrologic circuit breaker trip units, UPS units, and other Modbus RS-485 compatible devices.

a. Data stored in Power Monitoring Devices shall be accessible to external devices by means of RS-485 serial communications.

b. It shall be possible to connect from one communications port to another (daisy-chain) such that up to 32 Power Monitoring Devices may be connected to form a continuous communications link extending up to 4,000 feet.

c. Communications links shall be compatible with the RS-485 multi-drop communications standards.

d. Communication rates on the links shall be adjustable up to 19.2 k baud to provide acceptable throughput of power monitoring device data.

e. It shall be possible to connect up to an unlimited number of communications links into a large network using ethernet hubs to form a high-speed power monitoring and control network.

H. EPM Ethernet and Fiber Optic Communications Network:

1. Basic Ethernet Communications: Built-In Ethernet Ports, installed integral to the PowerLogic ION900T circuit monitor:

a. ION900T shall have an embedded web server inside the unit, capable of serving HTML pages with dynamic meter data displays.

b. ION900T shall connect to the ethernet backbone via standard RJ-45 port connection of unshielded twisted pair cable (UTP) or LC fiber optic connection for multimode fuber (100BaseFX).

c. There shall be indicating LED's for the ethernet connections to assist in troubleshooting. Indicators are required for TRANSMIT, RECEIVE, and LINK status for ethernet, and TRANSMIT, RECEIVE for the RS-485 communications.

d. ION900T shall support circuit monitors, power meters, and other PowerLogic compatible devices through one 2 wire or 4 wire RS-485 communication port via standard daisy-chain connections. The RS-485 serial port shall operate up to 38.4k baud.

e. ION900T shall allow protocol conversion between standard ethernet network protocols and PowerLogic (SY/MAX and Modbus/Jbus devices on the same daisy-chain).

f. ION900T shall be fully TCP/IP compliant thereby allowing the power monitoring software access to power monitoring information from anywhere on th elocal area network (LAN) or via the wide area network (WAN).

g. The protocol used over built-in ethernet ports shall be Modbus/TCP an internantional industry standard which is an open and well-defined protocol.

h. It shall be possible via the ethernet port to upgrade the firmware to accommodate new system features.

i. Web pages shall be configurable to display in tabular or trend chart format.

j. Data shall be displayed in tabular or trend chart format.

k. ION900T shall be capable of initiating an e-mail based on alarms or custom user logic programming in the host circuit monitor.

   1) Fifteen unique addresses shall be user configurable to receive e-mail notification from the ethernet communication card.

      a) Each address shall be user-configurable schedule assignment to only page during specific days of the week and hours of the day.

   2) E-mail shall be initiated based on user configurable alarm priority.

   3) E-mail shall be sent in the user-selected language of the circuit monitor display (English, French, Spanish, and the like).

   4) To prevent nuisance e-mails during repetitive alarms, an e-mail shall only be sent on a buffered basis when one of the following conditions is met:

      a) One of the alarm buffers fills to 38 events or.

      b) A predetermined amount of time elapses.

l. A dedicated ethernet port shall be used which requires no hardware adjustments or modifications. Standard personal computers (PCs) or programmable logic controllers (PLCs) are not acceptable as gateways to the power monitoring and control devices.

m. ION900T shall be UL listed, NOM, and CE and CSA certified.

n. Ethernet cabling shall be installed by a qualified data communications cable installer of the electrical contractor qualified to install data communications equipment. Communications cabling shall be Category 6 rated for 100baseT, or fiber optics rated for 100baseFX.

o. SNMP (Simple Network Management Protocol) shall be supported by the circuit monitor according to the industry

p. SNTP (Simple Network Transfer Protocol) shall be supported to allow date and time to be synchronized to within 1 second between monitors.

q. ION900T shall have embedded software that allows a user to create web pages for the host meter and other monitoring and protection devices. The tool shall be wizard based allowing the user to specify the name and address for each device and create web pages with no knowledge of HTML or Java scripting.

I. EPM Ethernet Gateway and Fiber Optic Communications Devices:

1. Basic Ethernet Gateway Schneider Electric (EGX-150/EGX-300):

a. Ethernet gateway shall feature one 10/100 Mbit UTP port.

b. Ethernet gateway shall provide a web based interface for device configuration and diagnostics.

c. Ethernet gateway shall feature one serial port that is configurable for RS232 or RS485 with support for 2-wire and 4-wire daisy-chains.

d. A single ethernet gateway, assigned a single IP address, shall provide high speed Ethernet support for up to 247 Modbus devices or 199 PowerLogic (SY/MAX) devices. Device support for a daisy-chain of greater than 32-devices may require additional hardware.

e. The ethernet gateway shall feature the following protocols: Ethernet – ModbusTCP/IP, HTTP, FTP, SNMP (MIB2), TCP, UDP, IP, ICMP, and ARP. Serial -- MODBUS, JBUS, and POWERLOGIC (SY/MAX).

f. The ethernet gateway shall provide the ability to control the access of ModbusTCP/IP master devices attempting to communicate with attached serial devices. The gateway shall be able to not allow access and shall have the ability to limit access to read-only or provide full access to the attached serial devices.

g. Ethernet gateway shall have an input voltage of 24 Vdc and a maximum burden of 8 Watts.

h. Ethernet gateway shall allow control power to be received through the ethernet cable utilizing Power over Ethernet (PoE) conforming to IEEE 802.3 af.

i. Ethernet gateway shall operate in ambient temperature of 25 to 70 degrees C, an ambient storage temperature of minus 40 to 85 degrees C and shall operate in relative humidity of 5 to 95 percent.

j. Ethernet gateway shall be a stand-alone product in an IP30 enclosure that is DIN- rail mountable.

k. Ethernet gateway shall be compliant with electromagnetic interference emissions conforming to CEI EN 55022, CEI EN 55011, FCC Class A, and for immunity conforming to CEI EN IEC 61000-6-2.

l. Ethernet gateway shall be compliant with regulatory and safety standards for the USA, Canada, Europe, Australia, and New Zealand conforming to IEC 60950-1 and UL 508.

m. Ethernet gateway shall be compatible with Ethernet TCP/IP.

n. Gateway shall provide a twisted pair connection to connect to the ethernet backbone. The ethernet twisted-pair port shall have: An RJ45 connector, support for 10/100BaseTx connection with auto-negotiate and user specified parameters of 10Mb or 100Mb, full-duplex or half duplex. LED’s shall be provided to indicate ethernet link, speed, and activity. At a minimum, there shall be the following LED’s: 1 for physical Ethernet link (LK), 1 for transmit (TX), 1 for receive (RX), and 1 for the speed (10/100).

o. Ethernet gateway shall have a serial RS-485 port that is used to connect serial field devices to LAN. RS-485 serial port shall have the following specification: Support up to 32 serial devices without a repeater. Support for Modbus, Jbus, PowerLogic, and mixed mode daisy chains. Support for both 2-wire or 4-wire daisy chains. Support for baud rates of 2400 to 38400. Support for parity values of even and none. Provide pluggable screw terminal type connectors with a minimum of 5-positions. Provide LED’s to indicate serial communication activity. At a minimum, there shall be the following LED’s; 1 for Transmit (Tx), and 1 for Receive (Rx) per port.

p. Ethernet gateway shall have a minimum of one port that can be configured for either RS-485 or RS-232. An LED indicator shall be provided to indicate which port is active (RS485 / RS232).

q. The serial port shall have configurable biasing and termination to support 2-wire and 4-wire communicating devices.

r. Ethernet gateway shall provide internal jumpers to support 2-wire daisy-chains that can be applied or removed from the communication lines.

s. Ethernet gateway shall allow a Modbus serial master on its serial port to request data from devices on a TCP/IP network. A minimum of 16 remote IP addresses shall be supported across the entire Modbus address range of 1 to 247. A minimum of 128 remote devices shall be supported.

t. Ethernet gateway shall be configurable by either RS-232 connection via Hyper Terminal® interface or ethernet connection via standard web browser.

u. Ethernet gateway shall provide a user interface that includes English, French, and Spanish languages.

v. Setup of the ethernet gateway shall be accomplished via the on-board ethernet port and a web browser. No software shall be required for configuration of the gateway that is not a standard component in Microsoft’s off-the-shelf operating systems.

w. Ethernet gateway shall support field upgradeable firmware without need of any special software not present in Microsoft’s standard operating systems to accommodate new system features.

2. Advanced Fiber Optic Ethernet Gateway:

a. The advanced fiber optic ethernet gateway shall be a Square D by Schneider Electric No. NTRON710FX2, with 6 RJ-45, UTP, 4-10/100 Mbps Ports and 2 100baseFX multi-mode fiber optic ports.

b. FO ethernet gateway shall provide a web based interface for device configuration and diagnostics.

c. FO ethernet gateway shall connect to the ethernet backbone via standard RJ-45 port for connection of unshielded twisted pair cable (UTP) or LC fiber optic connection for multimode fiber (100BaseFX).

d. There shall be indicating LED's for the ethernet connections to assist in trouble-shooting. Indicators are required for TRANSMIT, RECEIVE, and LINK status for ethernet.

e. FO ethernet gateway shall be fully TCP/IP compliant thereby allowing the power monitoring software access to power monitoring information from anywhere on the local area network (LAN) or via the wide area network (WAN).

f. The protocol used over ethernet by FO ethernet gateway shall be Modbus/TCP an international industry standard which is an open and well-defined protocol.

g. Setup of FO ethernet gateway shall be accomplished via the on-board ethernet port and a web browser. It shall also be possible via the ethernet port to upgrade the firmware of FO ethernet gateway in the field to accommodate new system features.

3. Additional Network Media Options:

a. Fiber optics shall be installed where shown on Drawings. Fiber optic modems and interface hardware shall be provided by EPM vendor as required. Use of fiber optics shall be transparent to EPM software and monitoring devices.

b. Wireless ethernet shall be installed where shown on Drawings. Wireless ethernet and interface hardware shall be provided by the EPM vendor as required. Use of wireless ethernet shall be transparent to EPM software and monitoring devices.

c. Ethernet shall be used where shown on Drawings. PowerLogic ethernet gateways shall be provided by EPM vendor and installed as necessary. Ethernet network connections shall be established using industry standard ethernet protocols such as TCP/IP. Components shall work with existing ethernet gateway, router, and Hub technology. Use of ethernet shall be transparent to EPM software and monitoring devices.

J. Ship Simulation Unit (SSU):

1. Ship Simulation Unit for Container Ships:

a. Ship Simulation Unit shall be trailer-mounted for easy access and shall have the capability of being transported by means of towing to and from various ship-to-shore outlet box locations. Trailer shall have jack stands to secure the equipment in place during SSU operation.

b. SSU shall be PLC based capable of simulating normal ship conditions and display information using HMI Screen. Ship conditions to be simulated as follows:

1) Ship Breaker Status

2) Close Permissive Contacts

3) Ground Check Continuity

4) Ship Emergency Trip Actuation

c. SSU shall consist of the following:

1) Programmable Logic Controllers (PLC)

2) Human Machine Interface (HMI) in Stainless Steel Enclosure

3) Zener Diodes for Continuity Checks

4) Ship Connectors for connectivity to shore power outlet boxes

5) Control Transformers

6) Control Devices

7) Pilot Lights and Indicating Devices

2.3 APPLICATION SOFTWARE, SOFTWARE LICENSES, AND COMPONENTS

A. Supply EPM with user-friendly application software suitable for operation on server computers or personal computer workstations, which serve as central control stations by monitoring the devices in the system, recording events, indicating alarm conditions, and displaying and logging device data. EPM application software shall be PowerLogic, Power Monitoring Expert (PME) version 12 or higher.

B. Provide a list of the software needed on Project and indicate which packages are being supplied.

C. Configure and deliver software ready to use. This configuration shall include preparation of the graphics, displays, and interactive one-line diagrams required as a part of Project.

D. Describe the procedure to be used to allow the software to support additional monitoring devices at a future date, including graphics. The description shall be in sufficient detail to allow the user to make the modifications without vendor support.

E. Supply software keys, software licenses, and other programming tools that the user shall need to change the software displays, one-line diagrams, or accommodate new monitoring devices.

F. Software shall be a Microsoft Windows (latest release) application designed to monitor the entire system of power monitoring devices in the background for alarms, events, and data logging, allowing the operator to perform other tasks with the workstation. To fully utilize the power of PCW, EPM software shall operate in Windows enhanced mode.

G. Software Capabilities:

1. General:

a. Power Monitoring and Control Software shall be a web-enabled monitoring system intended to monitor an entire electrical distribution infrastructure, from incoming utility feeds down to low voltage distribution points.

b. The system shall be designed to monitor and manage energy consumption throughout an enterprise, whether within a single facility or across a network of facilities, to improve energy availability and reliability, and manage and measure energy efficiency.

c. The software shall be a standard product based on a successful, proven software platform.

d. Key Features:

1) Data acquisition for metering devices, sensors, and other intelligent electronic devices.

2) Power quality analysis (including harmonics, and voltage and current sinusoids).

3) Power quality compliance to international standards:

a) CSA IEC 61000-4-30 Class A.

b) DIN EN 50160.

4) Graphical displays of information.

5) Reporting tools with standard reports.

6) Interactive historical data analysis.

7) Water, air, gas, steam monitoring.

8) Power Factor monitoring and control.

9) Interoperability with disparate devices and systems through OPC client and OPC server.

10) Third Party Device Integration through Modbus RTU and Modbus TCP protocols.

11) Support real-time data display and control actions for multiple users for applications such as sub-metering, load monitoring / shedding, real-time pricing and generator control.

12) Expansion of system through distributed IO servers.

2. Power Monitoring Software Components:

a. The software shall be web enabled, user friendly, suitable for operation on the computer workstations, to provide a robust, reliable, and secure data network.

b. The software shall be PowerLogic monitoring and control software and shall interface with Schneider Electric metering and equipment.

c. The software shall support the easy integration of other third party intelligent electronic devices (IED's).

d. The power monitoring software shall have core components operating as services in Windows operating systems. The core services shall consist of:

1) Connection Manager: To manage connection request for power monitoring system components.

2) Log Server: Provides power monitoring system historical data storage and retrieval.

3) DDE Server: Enables inter-application distribution of power monitoring system data.

4) Site Server: Manages interactions between local and remote power monitoring system components.

5) Network Router: To manage data traffic between servers in the power monitoring system.

6) Virtual Meter: Provide system-wide aggregation, control and mathematical analysis of power monitoring data.

7) Query Server: To provide client access to live and archived databases.

8) Alert Monitor: To receive alarm information generated by exception from metering devices outside of normal polling cycle.

3. Data Storage and Data Sharing:

a. The power monitoring software shall use Microsoft Server 2022 Standard Edition with Microsoft SQL Server 2022 Express Edition as the database to store and retrieve historical data.

b. Data storage/retrieval application shall have the ability to autonomously retrieve from the devices in the power monitoring network and provide the following abilities:

1) Interrogate and download logs of interval data stored onboard PowerLogic system and metering range of metering devices.

2) Interrogate and download logs of alarm and event data stored onboard PowerLogic system and metering range of metering devices.

3) Interrogate and download logs of waveform capture data stored onboard PowerLogic system and metering range of metering devices.

4) Interrogate and download logs of interval data stored onboard Micrologic circuit breaker control units.

5) Interrogate and download logs of alarm and event data stored onboard Micrologic circuit breaker control units.

6) Interrogate and download logs of waveform capture data stored onboard Micrologic circuit breaker control units.

7) Interrogate and download logs of interval data generated by the software system (software-based logging).

8) Interrogate and download logs of alarm and event data generated by the software system (software-based alarming).

9) Automatically re-arm the waveform recorders, upon upload of information.

10) Automatically detect downstream devices that are Modbus-mastered on PowerLogic metering devices, and store logged data in the database associated to a unique name for each downstream source.

11) Detect unknown measurement quantities provided by devices in the network, and automatically generate appropriate database references for those quantities without user intervention.

c. The database shall have the capability to record the information to 1 ms precision.

d. Provide a facility to archive, trim, and backup the database on demand, or on a schedule.

e. Provide a facility to view historical data from archived databases.

f. Support user initiated changes to the database, with the following abilities:

1) Support on-line changes (while the data storage/retrieval application is running).

2) Suffer no interruption to its operation while changes are being made.

3) Requires no restart once the configuration has been performed.

g. Power Monitoring Software shall store the information related to the network configuration in a Microsoft SQL Server 2022 Express database, including:

1) Devices in the power monitoring network.

2) Communications gateways in the power monitoring network.

3) Distributed IO servers and other load-distributing application servers in the power monitoring system.

4) Modems supported by the power monitoring software.

5) Network configuration settings.

6) Connection schedule for:

a) Serial sites.

b) Modem sites.

c) Ethernet sites.

4. User Interfaces:

   a. Power Monitoring and Control Software shall provide at a minimum the following types of graphical user interfaces:

      1) Graphical Display interface.

      2) Historical Reporting interface.

      3) Device Configuration interface.

      4) Network Configuration interface.

   b. Power Monitoring software shall provide 5 levels of user security:

      1) View: The viewer shall be permitted to view information. No change privileges allowed.

      2) User: Same as View, but is able to initiate control functions.

      3) Controller: Same as User, but is able to initiate communications.

      4) Operator: Same as Controller, but is able to modify configurations.

      5) Supervisor: Same as Operator, but is able to administer security privileges.

5. Graphical Display Interface:

   a. The graphical display interface, (GDI) refers to information and functionality available from PowerLogic software screens. GDI shall provide the ability to create and view graphical representations of the power monitoring system, including electrical one-line diagrams, facility maps, plan views, floor layouts, equipment representations, and mimic displays.

   b. GDI shall provide the ability to display real-time information from Power Monitoring system within the graphical displays, including numeric values, Boolean or discrete status values, and historical information stored in the database.

c. GDI screens shall show parameters which are available from the individual remote devices by device, including but not limited to metered values, load status, alarm status, energy data, device position and/or status, device data logs, waveform capture, sag/swell events, and the like. In addition, the screens shall be capable (if allowed by the owner) of providing for suitable tripping, closing, and opening of appropriate remote devices.

d. The software Web Based clients shall not require loading of software to view the system screens and data.

e. The software shall allow unlimited screens and unlimited screen penetration to lower-level detailed screens.

f. The software shall provide the following screens as standard in the software (if supported by the device):

    1) Real-time device information like line to line and line to neutral voltage and current readings for power meters in a line diagram format.

    2) Event logs.

    3) Alarm logs.

    4) Historical trend plots.

    5) Real-time trend plots.

    6) Waveform capture display with zoom in/out capability.

    7) Harmonic analysis display.

    8) Phasor display.

    9) Time-of-use display.

    10) Power quality display.

    11) I/O status display.

    12) Setpoint and setup display.

    13) Device log and setup display.

    14) Computer Business Equipment Manufacturers Association (CBEMA) curve display.

15) One-click access to device logs, including long-term min/max, voltage, current, power, frequency, and power factor trending.

16) Flicker.

17) Number of nines availability.

g. GDI shall provide the following capabilities for time-series historical analysis:

1) Ability to view and trend the time-series historical data stored in the database.

2) Ability to view alarm and event information stored in the database.

3) Ability to view and analyze waveform capture data stored in the database, including visualization of voltage and current sinusoids, histograms of harmonics, and phasor diagrams.

h. The software shall allow the user to set an unlimited number of individual computer alarms for monitored parameters, such as setting low and high alarm levels for voltage, current, motor run time, and the like.

i. These alarm levels shall be independent of device built-in alarm levels. The alarm settings shall support signed values (+/-) as well as high and low limits.

1) The software shall support setting multiple limits, providing additional alarm points above or below the initial limit.

2) The software shall display the analog value that caused the alarm on the alarm screen (time and date stamped), and log same information to the event file.

3) The software shall have a fully customizable alarm/event log where unlimited log views can be created by the user in real-time for organizing, filtering and prioritizing different alarms (e.g. PDU Alarms, Critical Alarms, Generator Alarms, General Alarms, All Alarms, and the like).

4) The alarm displays shall allow customized alarm annunciation in the form of:

a) Playing of any .wav file.

b) Loop the playback of any .wav file until the operator acknowledges the alarm.

c) Flashing of the program header in the Windows Taskbar.

d) Launching of a command line application.

e) Activate the output of any power monitoring devices or control point.

f) Message box pop-up.

j. GDI shall have the ability to create, edit, save, and view diagrams with the following features:

1) Support graphic characters, symbols, and pictures.

2) Ability to import graphic object libraries from other Windows graphical applications.

3) Create user configured system diagrams.

4) Ability to display a number of diagrams simultaneously.

5) Ability to modify display formats.

6) Ability to use animation, including changing shape, flashing symbols, and AVI files.

7) Support grouping windows.

8) Hot spots – for control functions and to open diagrams giving multilevel hyper linking between diagrams.

9) GDI shall have the ability to create, edit, save, and view the following types of display objects:

a) Text Objects: Display static text for messages, instructions, and labeling.

b) Alphanumeric Objects: Display numeric values, Boolean values, textual values, using:

1 Dynamic text.

2 Analog dials/gauges.

3 Formatted numerics.

4 Bar charts.

5 Scrolling strip chart displays.

c) Status Objects: Display Boolean values and textual values using dynamic text, or animation via bitmaps or AVI files, or dynamically toggle a display object graphic image based on a Boolean status value.

d) Data Log Viewer: Display selected data and waveform logs from the system database.

e) Event Log Viewer: Display the selected event log records from the system database.

f) Control: Provide the ability to toggle Boolean values, enable/disable status, and trigger control functions.

g) General Objects: Can be used to display any supported image file, or link to another diagram, web page, or external application.

h) The software shall include a library of electrical symbols and diagram elements for use in custom displays.

10) Data and Event Log Queries:

a) The data log viewer and event viewer queries shall be able to be configured using a wizard interface, or by specifying a complex query statement.

b) Each query shall be able to be set to an icon or button for repeatability (i.e. last 7 days loading, critical alarms, UPS alarms, and the like). These icons shall be able to be placed in any graphic screen or table.

c) Unlimited queries shall be possible. The query shall allow the user to mix, sort, filter and trend the alarm/events and electrical data in any way the user desires (by date, by device, by priority, and the like) in order to provide the user with a limited data set to review and analyze.

d) It shall be possible for the user to access a list/table of just the events desired for a particular device, group of devices or particular events (sags, trip events, and the like) by clicking on an icon on the screen.

e) Time-series data provided by a data log query shall be able to be charted. The chart shall support interactive analysis functions including zooming, panning, and the display of statistics like minimum, maximum, and average values.

k. GDI shall display visual indicators when data values are not available.

1) When real-time data values are not available, the user shall be able to see the source of the error through tool-tips that are presented when the mouse hovers over the affected value display object.

l. Web Enabled Capabilities:

1) The server shall provide access to information using an interface that provides the same look and feel as the user display interface software.

2) Diagrams created in the user display interface software shall automatically be rendered as a page, viewable to clients over the web. No programming shall be required.

m. When viewing historical data, the software shall provide the following capabilities:

1) Selectable date range.

2) Selectable data parameter to chart.

3) Zoom, pan, and scroll the drawing to any desired magnification.

4) Able to de-select parameter on chart.

5) Able to modify the following:

a) Chart type (each selected parameter).

b) Chart color (each selected parameter).

c) Export chart in the following formats:

1 Jpeg.

2 GIF.

n. Exporting data in text, XML, or HTML formats.

6. Device Configuration Software:

a. The device configuration software shall provide the ability to interrogate and graphically display the onboard configuration of PowerLogic system and metering devices.

b. The device configuration software shall provide the ability to fully configure the onboard configuration of PowerLogic system and metering devices, including:

1) Metered quantities that are logged to onboard interval data logs.

2) Alarm and event conditions and logging to onboard event logs.

3) Waveform capture logs.

4) The size and behavior of the onboard logs.

c. Ability to customize the onboard functions of PowerLogic system and metering devices using graphical configuration tools.

d. Ability to customize the functions of the software-based virtual meter using graphical configuration tools.

e. Ability to copy and paste PowerLogic parameters.

f. Ability to customize which onboard logs are downloaded to the database.

g. Toolbox with the supported functional modules for the specific device type and shall provide:

1) Quick link to specific modules.

2) Display the number of modules currently in use.

3) Graphically represent the device configuration and linkages.

4) Ability to upload device templates to other devices.

5) The device template shall be capable of being saved for future use.

6) Provide standard Windows functionality, for example copy and paste.

7) Users without appropriate security login credentials shall only be capable of viewing device configuration.

7. Network Configuration Software:

a. Network Management: The network configuration software shall provide a graphical interface with the following abilities:

1) Add and remove devices in the power monitoring network.

2) Paste device name and address information from Microsoft Excel.

3) Provide an automated mechanism to name any number of devices based on a user-defined naming scheme.

4) Add and remove IO servers in the power monitoring network.

5) Edit advanced communication properties for devices including timeouts and delays.

6) Display a visual indication to the user of the mandatory fields to add a new device.

7) Associate devices into a hierarchy using a group name.

8) Manually connect and disconnect serial, ethernet, modem, and ethernet gateway sites.

9) Enable and disable devices and sites in the power monitoring network without interruption to other devices or sites.

10) Provide a fully configurable connection schedule for any site.

11) Provide a diagnostics viewer to monitor:

a) Communication request/response, error rates, and timeouts.

b) Log acquisition services.

12) Provide a view of system diagnostic events.

b. Database Maintenance Tool:

1) Software shall include an integrated database management tool that is designed specifically to manage the databases of the power logic monitoring and control system.

2) The database maintenance tool shall require a login window and security to prevent unauthorized use of the tool.

3) The database maintenance tool shall provide backup, archiving and trimming functionality. At a minimum, the tool shall:

a) Provide start and end date for operation.

b) Be capable of copying data to another database and / or trimming the data from the existing database.

c) Be capable of selecting any of the following type of logs for the required operation:

1 Data logs.

2 Event logs.

3 Waveform logs.

4) The database maintenance tool shall provide the capability to attach and detach databases.

5) The database maintenance tool shall provide the ability to configure alarms on the database, including the ability to email an alarm if the database size exceeds a configured value.

c. License Manager:

1) Network Configuration Software shall provide a software license management tool.

2) The license management tool shall allow users to upgrade the license key that activates Power Monitoring Software without the re-installation or rebooting of the software.

3) Power Monitoring Software shall not require the use of a hardware activation key.

d. User Administrator Tool:

1) Network Configuration Software shall provide a user administration tool.

2) The user administrator tool shall provide the following abilities:

a) Allow users to view the current list of user names and their level of security.

b) Add, remove, and modify users and level of security.

c) Any modification requires the supervisor password.

e. Modbus Device Importer Tool:

1) Network Configuration Software shall provide a user Modbus device importer tool.

2) Modbus device importer shall provide a graphical interface for specifying Modbus register information for devices that are not natively supported by the power monitoring software.

3) The tool shall have a quick edit function to easily duplicate and edit register information.

4) The tool shall support multiple register formats including 16 and 32 bit signed and unsigned registers, floating point registers, and little-endian and big-endian formatted registers.

5) The tool shall support the ability to define scaling, multiplier, and offset registers for any other register.

6) The tool shall support data entry of registers in either decimal or hexadecimal format.

7) The tool shall support the creation of text labels for enumerated values.

8) The tool shall support the ability to add a named device type to the power monitoring system network database in order to create instances of Modbus device.

9) The tool shall provide the ability to associate a template graphical display with the device type.

10) The tool shall provide the ability to associate Modbus registers with user-specified measurement quantities.

    a) If the user specified quantity does not pre-exist in the power monitoring system database, the power monitoring system shall automatically create it.

11) The tool shall provide a facility to validate Modbus device profile and alert the user to validation errors such as: duplicate registers.

8. Reporter:

   a. The power monitoring software shall provide a reporting tool to view historical data in pre-formatted report templates.

   b. Reports shall be based on Microsoft Excel.

   c. Custom reports shall be able to be created using Visual Basic for Applications (VBA).

   d. The reporting tool shall provide the following features:

      1) Report generation shall be able to be user configurable on event, on a schedule, or manually activated.

      2) Ability to export to HTML, printer, or network folder.

      3) Ability to distribute reports via email using Microsoft Outlook.

      4) Ability to validate for duplicate or missing data.

   e. The reporting tool shall provide standard report templates as follows:

      1) Energy and demand report that utilizes a user-defined time-of-use schedule with tariff rates for on-peak and off-peak.

      2) Load profile report with a trend chart peak demand indication.

      3) System-wide interactive Power Quality report with CBEMA evaluation.

      4) DIN EN 50160 Compliance report.

      5) CSA IEC 61000-4-30 report.

f. Each default report shall provide the following options:

1) Summary aggregation of data from the selected devices.

2) Individual device information.

3) Raw data.

g. Provide PowerLogic billing module software and license. The billing module software shall provide a graphical interface to create and manage multiple Time of Use (TOU) schedules:

1) TOU editor shall provide the ability to define multiple tariffs including energy cost rates per kWh, kVARh, and kVAh, and demand charges per kW, kVAR, and kVA.

2) TOU editor shall provide the ability to define off-peak and on-peak times.

3) TOU editor shall support the ability to define cost in any currency, including dollars, pounds, Euro, and the like.

9. Communications Subsystems:

a. The software shall support multiple communications network topologies including:

1) Direct serial communications on an RS-485/RS-232 network using ModbusRTU protocol.

2) Ethernet/TCP connections from the software using ModbusTCP protocol through the use of an ethernet-to-serial gateway using devices using any protocol supported by the gateway and converted to ModbusTCP.

b. The system shall have the capability to provide time-synchronization signals over an ethernet network with 16ms accuracy.

10. Operating Environment:

a. The software shall be installed on a Microsoft Windows operating system.

b. The software shall use a Microsoft SQL Server database.

c. The software shall support the deployment of the system in a distributed IT environment utilizing a dedicated database server and a dedicated application server.

d. The distributed configuration shall allow a configurable TCP port for communications between the application server and database server.

2.4 POWERLOGIC SYSTEM CONTROL AND DATA ACQUISITION SYSTEM SOFTWARE (PL SCADA)

A. PowerLogic System Control and Data Acquisition System Software, (PL SCADA), shall be a web-enabled monitoring system intended to monitor an entire electrical distribution infrastructure, from incoming utility feeds down to low voltage distribution points.

B. The system shall be designed to monitor and manage energy consumption throughout Department, whether within a single facility or across a network of facilities, to improve energy availability and reliability, and manage and measure energy efficiency.

C. The software shall be a standard product based on a successful, proven software platform.

D. PL SCADA system shall be dedicated to the monitoring and control of LV/MV/HV equipment at each Department Project Site or facility with the purpose of providing a safer and enhanced management of the electrical distribution.

E. PL SCADA system shall be accessible to operators in charge of the electrical distribution for a better management of operations related to electrical distribution. The system shall be also accessible to Department personnel in charge of the electrical distribution for an enhanced understanding and handling of situations related to electrical distribution operations.

F. PL SCADA shall provide the following:

1. Monitor one-line diagrams.

2. React “in real time” to any alarms enunciated.

3. Allow for redundancy both in server and communication network.

4. Be scalable from a very small solution to a very large solution.

5. Communicate to third party devices.

6. Allow for quick changes to screens within HMI panels.
7. Allow Modbus TCPIP Communication view.

G. PL SCADA System Architecture:

1. PL SCADA system shall be an open solution that can easily be expanded into a larger system. It shall be based on a distributed and modular architecture. The system is designed to change as Project Site evolves over time.
2. PL SCADA system shall achieve millisecond time-stamping of alarms and events, with a comprehensive time synchronization solution.
3. When installed and combined with PowerLogic EPM software, the system shall maintain time synchronization between circuit monitors, power meters, PowerLogic relays, ethernet gateways and switches, transformer temperature monitors, PLCs, HMIs, and the I/O servers.
4. Communication: The following communication characteristics shall be supported within PL SCADA software:
    a. Modbus TCP communication with devices including time stamped data and waveform formats.
    b. SNMP protocol.
    c. NTP protocol.
    d. OPC DA client.
5. Multiple PL SCADA Clients: PL SCADA system shall support both View only and Control Clients for Department operators, managers and engineers, depending on Project Site topology:
    a. Control client provides the user with monitoring & control capabilities.
    b. View only client provides the user with only view / monitoring capabilities.
    c. Web client (available in either View only or Control versions) which provides those capabilities over the web.
    d. User specific privileges shall be configurable.

H. PL SCADA Device And Data Support:

1. Device Support: PL SCADA system shall provide the following device support:

a. PowerLogic model ION9000 series.

b. PowerLogic model PM8000 series.

c. PowerLogic model PM5000 series.

d. PowerLogic model CM4000 series.

e. PowerLogic model PM800.

f. PowerLogic model PM700.

g. PowerLogic model CM2000.

h. PowerLogic model BCM and BCPM.

i. Square D PowerLogic Series 20, 40, and 80 protection relays.

j. Square D PowerLogic P5 and P7 series protection relays.

k. Square D Easergy P5F30 protection relay.

l. Square D Micrologic 5P, 6P, Type A,Type A FW2, and Type X.

m. Schneider Electric PLCs and Vartech HMIs.

n. Real time data from third party devices using Modbus TCP/IP protocol communication.

2. Data Support: PL SCADA system shall natively support the following data:

a. Real-time data from any device on Modbus TCP/IP.

b. Waveform captures from PowerLogic Monitoring and Control devices.

c. Time-stamped data from PowerLogic Monitoring and Control devices.

I. PL SCADA Monitoring and Control Features:

1. PL SCADA system shall offer real-time monitoring and control features over the electrical distribution system.

2. PL SCADA system shall display:
    a. Login information for user access.
    b. A permanent alarm banner, which displays the latest 5 active and unacknowledged alarms.
    c. A first level menu bar with 4 tab options:
        1) Single-lines: displays the real-time monitoring / control interface.
        2) Alarm/events: displays the alarm/event pages.
        3) Analysis: displays the trending and waveform monitoring interfaces.
        4) System: displays the system supervision screen interface.
    d. Detailed views shall be accessible on the second level menu bar.
3. Single-lines: The single-line diagrams shall be dynamically animated with:
    a. Status of the equipment.
    b. Analog measurements.
    c. Busbar Dynamic Coloring: The busbar changes of color dynamically depending on the status of the equipment and the voltage level on the busbar. The coloring of the busbars and equipment shall depend on the status and the voltage level. The definition of colors for each voltage level shall be configurable.
4. Each electrical distribution equipment, such as a circuit breaker, shall be defined as an object and monitored in real-time, such as but not limited to:
    a. CB Status: open, close, trip, error.
    b. CB Information: communication status, racked in/out, local/remote, tripping, health status.
    c. Alarm status.
5. By clicking on the object, the user shall have access to a first pop-up. From this pop-up, the user shall have access to the trending or to a secondary pop-up, which displays the complete information available for this equipment.

6. Navigation through the single-line pages may be done through the secondary menu bars or directly on the single-line page by clicking on active links on the page.
7. Alarms and Events: Several types of alarms and events pages shall be available, through the secondary menu bar, such as:
    a. Event view.
    b. Active alarms view (active and unacknowledged).
    c. Unacknowledged alarm view.
    d. Disabled alarm view.
    e. Additional views for alarms can be customized.
8. From an alarm, the user shall:
    a. Access the associated single line diagram.
    b. Ability to acknowledge/disable the alarm.
    c. Access any associated waveform.
    d. Access to detailed view of the data associated with the equipment.
9. Analysis Tab shall display real time trends and historical trends. It shall be possible to select and monitor historical data tags. The trending function shall have the following characteristics:
    a. Instant Trend (Real-Time Analysis):
        1) Capacity to save and print an instant trend.
        2) Data sampling period is configurable at runtime.
        3) Ability for trend data to be saved/export for re-use in a Microsoft Excel or Word document.
    b. Trending (Historical Analysis):
        1) Capacity to view historical trends.
        2) Capacity to view Alarms.
        3) Capacity to save trends.

10. System screen shall allow the user the capability to monitor the communication network.
11. User access shall be controlled by configuring privileges. PL SCADA system shall provide a matrix that can be configured to the needs of the project. Privileges can be defined to describe the access rights of an operator, engineer, or administrator at each Project Site. By default, PL SCADA system shall be defined with the following privilege levels:
    a. CB, Switch control.
    b. Alarms acknowledgement.
    c. PC-based alarms configuration.
    d. User Administration.
    e. Shutdown Runtime.
12. From these privileges, PL SCADA system shall define standard operating roles that are combinations of these privileges. Each user's Safety Access can then be defined against one of these operating roles:
    a. Operator Level 1: Alarms acknowledgement.
    b. Operator Level 2: L1 plus circuit breaker and switch control.
    c. Engineer: L2 plus server-based alarms configuration and shutdown runtime.
    d. Administrator: Engineer plus add/remove users, full access.
13. Control features: PL SCADA system shall provide secured user access to control operations for equipment. Controls shall be secured through a sequence of commands which operates with the following functionalities:
    a. Authorization is required for control operations.
    b. Verify operator has the user rights to perform a control.
    c. Pop-up window requires operator confirmation to perform device control.
    d. Event logging of operator actions.
    e. Failed control execution results in an event.

J. PL SCADA Alarms, Events, and Logs:

1. PL SCADA system shall manage alarms and events for the electrical distribution equipment. An event is defined as a time-marked occurrence. An alarm is defined as an occurrence, typically an abnormal state that the user is required to acknowledge.

2. Field Alarms (On-board): Alarms with millisecond precision time stamp.

3. PL SCADA-based Alarms (Server Based): Alarms generated by PL SCADA software based on a pre-defined logic, such as:

   a. Analog alarms (use of dead-bands).

   b. Digital alarms (status checked).

   c. System state.

   d. Communications state.

4. PL SCADA system shall display several alarm and event views with the following features:

   a. Event View:

      1) One consolidated view for recorded events and alarms.

   b. Alarm Views:

      1) Alarm banner.

      2) Active alarm alarms view.

      3) Disabled alarms view.

   c. Alarm and Event Viewing Features:

      1) Time-stamped events / alarms.

      2) Chronological sorting.

      3) Advanced filtering capabilities.

      4) Print support.

      5) Run-time layout control (Administrator only).

      6) Configurable color coding based on severity of alarms.

d. Pop-up menu access from each alarm to:

1) Link to a single line diagram associated with the equipment.

2) A detail view associated with the equipment.

3) Ability to change alarm setpoints (limits) during run-time.

4) Ability to acknowledge an alarm.

5) Ability to disable an alarm.

6) Ability to view an associated waveform for supported devices.

e. Secure Alarm and Event Access:

1) Events cannot be deleted or changed.

2) Acknowledging Alarms.

3) Disabling Alarms.

4) Changing Alarm Setpoints (during run-time).

5. By default PL SCADA system shall provide 3 critical levels for alarms:

a. High: trip / power supply disruption.

b. Medium: alarm that prevents operation of the system, such as communication failure, or status discrepancies.

c. Low: alarms that do not interrupt operation of the system, but require attention, such as transformer overload.

6. PL SCADA system shall have the capability to perform alarm filtering. The following characteristics shall be present in the alarm filtering function:

a. Date/Time (alarms/events between a start and end date)

b. State : Appear / Disappear / Acknowledged (alarms) / Disabled (alarms)

c. Location: This shall follow the IEC 61850 tag naming convention

d. Critical alarm levels (3 levels minimum)

e. Equipment name

f. Areas (grouping of alarms)

g. Description

h. Custom Field (UPS Alarms)

i. Alarm Attributes:

1) Type: Power quality, Protection, System.

2) Group: Currents, Voltage, Power, Power Factor, Energies, Demands, and the like.

3) Category: Sag/Swell, Over/Under, Transients, Loss, Interruptions, and the like.

7. Alert Management: Alerts shall be triggered by an alarm. PL SCADA system shall provide the capability, upon a critical alarm condition, to:

a. Annunciate: operate a horn.

b. Print the alarm message on Department network printer.

c. Run other programs (and scripts) driven by events, (i.e. report generators, third party messaging systems, initiate e-mail notifications).

8. E-mail Notifications of Alerts and Alarm Conditions: In order for PL SCADA system to send e-mail notifications to Department e-mail recipients, (on PowerLogic events or UPS Alarm conditions), PL SCADA server requires access to Department’s SMTP server, (Simple Mail Transfer Protocol). PL SCADA server shall be located within the same LAN/domain as Department’s SMTP e-mail server. PL SCADA server requires authentication credentials, (username and password), to access Department SMTP server.

9. In order to setup E-mail notification from PL SCADA Server, PL SCADA Server requires IP Address and Server Name of Department SMTP Server.

10. When an alarm goes active, the alarm shall appear in:

a. Event log.

b. Active alarms log.

c. Unacknowledged alarms log.

d. Alarm banner.

K. PL SCADA Trending and Waveforms:

1. PL SCADA system shall provide the user interface for 2 types of trending:

a. Instant trending (real-time).

b. Historical trending.

2. Instant Trending: The operator shall have the ability to select any configured real-time tag in the system and monitor it in real time. (i.e. to monitor a specific event). The instant trend shall have the following features:

a. Instant trending shall be available for any real-time tag, monitored by the system.

b. Time sampling shall be configured during runtime and is defined by default to 1 second.

c. Instant trends can be saved as *.csv files and exported to other applications, such as Excel.

3. Historical Trending: The operator shall have the ability to select any pre-defined trend tag in the system and perform analysis on that data. The historical trending shall have the following features:

a. The data to be trended is configured at configuration time along with the sampling rate.

b. PL SCADA system shall provide as standard features the following trends:

1) Active power.

2) Voltage.

3) Frequency.

4) Current.

2.5 AUTOMATIC CONTROL

A. Programmable Logic Controllers (PLC's) shall be provided which communicate with the circuit monitors, power meters, electronic trip units, transformer temperature monitors, motor protective devices, digital protective relays, UPS’s, and other compatible devices for performing control operations.

B. PLC shall be Square D by Schneider Electric, part number: M340 processor with conformal-coated circuit boards and an integral 2MB memory expansion card and as indicated on Drawings.

C. PLC diagnostics shall be viewable via a web browser.

D. Each PLC shall include ladder programs which shall direct the automatic control operations as specified.

E. Processor, input, output, and network interface cards shall be provided as necessary to implement the sensing and automatic control operations.

F. PLC shall utilize the same Modbus/TCP ethernet network as EPM system.

G. PLC shall scan remote I/O using the ethernet network.

H. Data pertaining to the automatic control system shall be transmitted via EPM network to the server computers and/or remote personal computer workstations, as indicated on Drawings.

1. PLC's and PCW's shall operate independently of each other, and shall not be affected by the operation of any other PCW.

I. PLC Application Software shall be Square D Telemecanique Unity Pro L, (latest version), part number UNYSPULFTCD50. At a minimum the application software at the server computer or personal computer workstation shall provide the following:

1. Interactive color-graphics one-line of automatic control system (breaker status, relays status, and the like).

2. Automatic control operations (open/close breaker, relay operation, and the like) shall be date/time stamped and recorded in an event log.

3. Setup and display alarm conditions for automatic control operations shall be possible with each alarm condition entered in the event log.

4. Manual operator intervention via the keyboard or interactive one-line graphics shall be provided such that any point in the process may be controlled.

5. Manual intervention shall be password protected to prevent inadvertent or unauthorized override of the control scheme.

6. Protective relaying functions, anti-paralleling interlocks, or load limits shall not be defeatable.

2.6 APPLICATION HARDWARE DESCRIPTION

A. Contractor shall furnish the following computer hardware:

1. Rack-mounted server with 2U form factor shall be Square D Part Number 49788RACKSRV02. Server shall consist of 1 Dell PowerEdge R630 2U Rackmount Server Computer, including but not limited to the following features: 1 Intel Xeon E5540 quad-core processor, 64 bit bus, 2.53Ghz, 8Mb cache, turbo, HT, 1066MHZ. Memory shall be 4GB (2x2GB), 1066Mhz dual ranked UDIMMs for 1 processor, Adv ECC, and 4 hard drives (4x146GB), 15K RPM Serial-Attach SCSI 3Gbps, 3.5-in Hotplug drives with hard drive controller, PERC6i SAS RAID Controller PCIe 256MB cache. Operating system shall be Windows Server 2008 Standard Edition with applicable service packs and 5 CALs. Network interface cards (NICs) shall be two (2x) embedded Broadcom NetXtreme 115709 Gigabit ethernet, and provide 1 DVD+/- RW ROM drive. Provide 1x6 backplane for 3.5-inch hard drives and redundant power supply with Y-cord. Provide keyboard, mouse, speakers, and 19 inch flat widescreen LCD panel monitor.

2. Install server, keyboard, mouse , monitor, fiber optic ethernet switch, and peripherals inside a free-standing server rack cabinet with dimensions approximately 28 inches wide by 42 inches deep by 72 inches high, with environmentally controlled lockable door, and lockable metal rear door.

3. Server rack cabinet shall be installed by Contractor inside substation.

4. Provide 120V uninterruptible power source to server rack cabinet.

5. Provide T-1 line with category 6 UTP ethernet cable connection for ethernet connection to existing Port of Los Angeles port-wide EPM Network for remote access and diagnostics. Provide second category 6 UTP ethernet cable connection to existing tenant ethernet Network for remote access and monitoring.

6. EPM manufacturer shall install Square D PowerLogic Application Software and software licenses on server computer, PC workstations, HMI's, and existing Port of Los Angeles laptop computer, as indicated on Drawings, to download data from EPM network and devices.

2.7 SHOP ASSEMBLY

A. EPM components, including circuit monitors, electronic trip units, transformer temperature monitors, motor protection devices, HMI enclosures, and digital relays, included within the power equipment lineups shall be factory installed, wired and tested prior to shipment to Project Site.

B. Control power, CT, PT and data communications wire shall be factory wired and harnessed within the equipment enclosure.

C. Where external circuit connections are required, terminal blocks shall be provided and the manufacturer's drawings shall clearly identify the interconnection requirements including wire type to be used.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install system in conformance with manufacturer's written instructions.

B. Wiring required to externally connected equipment lineups shall be installed by Contractor.

C. Contractor's interconnection wiring requirements shall be clearly identified on EPM system drawings.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Control stations and panels.

1.2 RELATED SECTIONS

A. Section 26 05 33.13 - Conduit For Electrical Systems

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 Bid Proposal Line Items.

1.4 REFERENCES

1.5 SUBMITTALS

A. Shop Drawings: Submit to NEMA ICS 1 indicating control panel layouts, wiring connections and diagrams, dimensions, support points.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 3 years documented experience, and with service facilities within 100 miles of Project.

C. Products: Listed, classified, and labeled as suitable for the purpose intended.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Control Switches and Stations:

1. Contacts: NEMA ICS 2, Form Z.

2. Contact Ratings: NEMA ICS 2, A150.

2.2 RELAY CABINETS

A. Boxes: Galvanized steel with removable endwalls.

2.3 POWER LIMITED WIRE

A. Remote Control Cable: Copper conductor, 300 volt insulation rated 60 degrees C, individual conductors twisted together and covered with PVC jacket.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in conformance with manufacturer's written instructions.

B. Install wiring in conduit in conformance with CONDUIT FOR ELECTRICAL SYSTEMS Section.

C. Install wiring in the following locations in conduit in conformance with CONDUIT FOR ELECTRICAL SYSTEMS Section.

3.2 CLOSEOUT ACTIVITIES

A. Demonstrate proper operation of system to Engineer and maintenance personnel.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Programmable controllers.

B. Remote input/output units.

C. Programmer/loader unit.

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 09 13 - Electrical Power Monitoring (EPM)

C. Section 26 13 31 - 15 kV Metal-Enclosed Switchgear 26 13 31 - 15 kV Metal-Enclosed Switchgear

D. Section 26 13 36 - 15 kV Metal-Clad Switchgear

E. Section 26 13 37 - 38 kV Metal-Clad Switchgear

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 IA 10029 - Guide for the Application, Handling, Storage, Installation, and Maintenance of Medium-Voltage AC Contactors, Controllers, and Control Centers.

B. NEMA ICS 1 - Industrial Control and Systems General Requirements.

C. NFPA 70 - National Electrical Code.

1.5 SUBMITTALS

A. Shop Drawings: Indicate electrical characteristics and connection requirements, including layout of completed assemblies, interconnecting cabling, dimensions, weights, and external power requirements.

B. Product Data: Provide data for each component specified showing electrical characteristics and connection requirements.

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.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 3 years documented experience and with service facilities within 100 miles of Project.

C. Products: Listed, classified, and labeled as suitable for the purpose intended.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in clean, dry area; maintain temperature to NEMA ICS 1.

1.8 FIELD CONDITIONS

A. Maintain temperature above 32 degrees Fahrenheit (F) and below 104 degrees F during and after installation of products.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Square D.

2.2 PROGRAMMABLE CONTROLLER

A. Description: Programmable controller manufactured to NEMA IA 10029.

B. Configuration:

1. Processor Unit: Include processor, power supply, random access memory and input/output modules.

2. Remote Input/Output Unit: Include input/output modules , interface module and power supply for system inputs and outputs.

C. Programmer/Loader Unit: Manual graphic display type.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in conformance with manufacturer's written instructions.

3.2 FIELD QUALITY CONTROL

A. Manufacturer Services: Provide the services of the manufacturer's technical representative to prepare and start systems.

B. Perform operational testing on control systems to verify proper operation and field wiring connections.

3.3 CLOSEOUT ACTIVITIES

A. Demonstrate operation and programming of controller.

3.4 MAINTENANCE

A. Provide a separate maintenance contract for specified maintenance service.

B. Provide manufacturer's service and maintenance of programmable controllers for one year from Date of Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Time switches.

B. Lighting contactors.

C. Accessories.

1.2 RELATED SECTIONS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems

B. Section 26 05 29 - Hangers and Supports for Electrical Systems

C. Section 26 05 53 - Identification for Electrical Systems

D. Section 26 27 26 - Wiring Devices

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. 47 CFR 15 - Radio Frequency Devices.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction.

C. NFPA 70 - National Electrical Code.

1.5 SUBMITTALS

A. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.

B. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

C. Operation and Maintenance Data: Include detailed information on device programming and setup.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum 3 years documented experience.

B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 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.

1.8 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.9 WARRANTY

A. Provide five year manufacturer warranty for all occupancy sensors.

B. Provide five year manufacturer warranty for utility grade locking receptacle-mounted outdoor photo controls.

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 required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

2.2 TIME SWITCHES

A. Digital Electronic Time Switches:

1. Description: Factory-assembled solid state programmable controller with LCD display, listed and labeled as complying with UL 916 or UL 917.

2. Program Capability:

    a. 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 field-configurable astronomic feature to automatically adjust for seasonal changes in sunrise and sunset times.

3. Schedule Capacity: Not less than 16 programmable on/off operations.

4. Provide automatic daylight savings time and leap year compensation.

5. Provide power outage backup to retain programming and maintain clock.

6. Manual override: Capable of overriding current schedule both permanently and temporarily until next scheduled event.

7. Provide remote photocell input with light level adjustment.

8. Output Switch Configuration: As required to control the load indicated on Drawings.

9. Provide lockable enclosure; environmental type per NEMA EN 10250 as specified for the following installation locations:

    a. Outdoor locations: Type 3R.

B. Electromechanical Time Switches:

1. Description: Factory-assembled controller with motor-operated timing dial mechanism and adjustable trippers for setting on/off operations, listed and labeled as complying with UL 917.

2. Program Capability:

    a. Astronomic Time Switches: With same schedule for each day of the week and skip-a-day feature to omit selected days with automatic adjustment for seasonal changes in sunrise and sunset times.

3. Schedule Capacity:

    a. Astronomic Time Switches: Capable of turning load on at sunset and off at either sunrise or selected fixed time.

4. Provide spring reserve backup to maintain clock during power outage.

5. Manual override: Capable of overriding current schedule both permanently and temporarily until next scheduled event.

6. Output Switch Configuration: As required to control the load indicated on Drawings.

7. Provide lockable enclosure; environmental type per NEMA EN 10250 as specified for the following installation locations:

   a. Outdoor locations: Type 3R.

2.3 OUTDOOR PHOTO CONTROLS

A. Stem-Mounted Outdoor Photo Controls:

1. Description: Direct-wired photo control unit with threaded conduit mounting stem and field-adjustable swivel base, listed and labeled as complying with UL 773A.

2. Housing: Weatherproof, impact resistant polycarbonate.

3. Photo Sensor: Cadmium sulfide.

4. Provide external sliding shield for field adjustment of light level activation.

5. Light Level Activation: 1 to 5 footcandles turn-on and 3 to 1 turn-off to turn-on ratio with delayed turn-off.

6. Failure Mode: Fails to the on position.

2.4 LIGHTING CONTACTORS

A. Manufacturers:

1. ABB: www.electrification.us.abb.com/

2. Eaton Corporation: www.eaton.com/

3. Schneider Electric: www.se.com/

B. Description: Magnetic lighting contactors complying with NEMA ICS 2, and listed and labeled as complying with UL 60947-1 and UL 60947-4-1; noncombination type unless otherwise indicated; ratings, configurations and features as indicated on Drawings.

C. Short Circuit Current Rating:

1. Provide contactors with listed short circuit current rating as indicated on Drawings.

D. Enclosures:

1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:

a. Outdoor Locations: Type 3R or Type 4.

2.5 ACCESSORIES

A. Auxiliary Contacts:

1. Comply with NEMA ICS 5.

2. Provide number and type of contacts indicated or required to perform necessary functions, including holding (seal-in) circuit and interlocking, plus one normally open (NO) and one normally closed (NC) spare contact for each lighting contactor, minimum.

B. Control and Timing Relays:

1. Comply with NEMA ICS 5.

2. Provide number and type of relays indicated or required to perform necessary functions.

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 at proper mounting heights 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 branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.

E. 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.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

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. Install lighting control devices in conformance with manufacturer's written instructions.

C. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

D. Install lighting control devices plumb and level, and held securely in place.

3.4 FIELD QUALITY CONTROL

A. Test time switches to verify proper operation.

B. Test outdoor photo controls to verify proper operation, including time delays where applicable.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Mineral oil liquid-filled substation transformer 18/24/30 MVA transformer, 34.5kV delta connected primary, dual tapped secondary 11kV/6.6kV wye connected with integral connected mounted 33 position 16 +/16 – step automatic vacuum 34.5kV primary load tap changer.

B. Primary incoming air terminal chamber (ATC) with provisions for terminating 2 bottom entry 34.5kV cables per phase.

C. Secondary outgoing air terminal chamber (ATC) with provisions for terminating four 12kV cables per phase and ten 4.16kV cables per phase; 2 neutral connection for 12kV/4.16kV system.

D. Secondary ATC shall include control power transformer with primary and secondary protection having capacity sufficient to power transformer 2 stage cooling fans and vacuum automatic load tap changer with controls.

E. Electric Power Monitoring (EPM) system shall employ same hardware and software as Department's existing EPM. New network and equipment shall interface and be completely compatible with the existing EPM network and components of the installed EPM base.

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 08 02 - Electrical Systems and Products Manufacturer's Certification, Quality Assurance, and Warranty Verification

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 Electrical System bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM D3487 - Standard Specification for Mineral Insulating Oil Used in Electrical Apparatus.

B. IEC 60068 - Environmental Testing.

C. IEC 60214-1 - Tap-Changers - Part 1: Performance Requirements and Test Methods.

D. IEC 60255 - Measuring Relays and Protection Equipment.

E. IEC 61850 - Communication Networks and Systems in Substations.

F. IEEE C37.90.1 - IEEE Standard for Relays, Relay Systems, and Control Devices Used for Protection and Control of Electric Power Apparatus--Surge Withstand Capability (SWC) and Electrical Fast Transient (EFT) Requirements and Tests.

G. IEEE C57.12.00 - IEEE Standard for General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.

H. IEEE C57.12.10 - IEEE Standard Requirements for Liquid-Immersed Power Transformers.

I. IEEE C57.12.91 - IEEE Standard Test Code for Dry-Type Distribution and Power Transformers.

J. IEEE C57.131 - IEEE Standard Performance Requirements and Test Methods for Tap-Changers.

K. ISO 9001 - Quality Management Systems — Requirements.

L. NEMA TR 1 - Transformers, Step Voltage Regulators and Reactors.

1.5 SUBMITTALS

A. Submit the following to Engineer within 14 Calendar Days of Notice to Proceed (NTP):

1. Complete dimensional assembly Drawings showing plan, elevation, section views where applicable, weights, primary and secondary conduit entrance locations.

2. Plan showing exact location and details of channel sills, anchor bolt locations, and terminations of power cables and control cables. Plan shall show location of accessory and control items by device number.

3. Elementary or schematic Drawings

4. Bill of Material listing devices, controls, and accessories to be furnished in Project. The Bill of Material shall include complete identification and description of devices.

5. Drawings shall include center of gravity location for developing seismic anchoring details based on equipment installed location.

6. Wiring diagrams and schematic shall identify accessory items and location relative to front elevation location. External input requirements shall be clearly marked on the wiring diagram. Where components are mounted on hinged covers, components shall be shown as viewed from the rear when cover is open.

7. Terminal block drawings shall allow space to show connections.

8. Revisions to Drawings shall be detailed and identified.

9. 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.

1.6 QUALITY ASSURANCE

A. Manufacturer shall be certified ISO 9001.

B. Manufacturer's Master Quality Control Manual shall be available for review at manufacturer's facility during any visit by Engineer. Transformer manufacturer shall have a minimum of 5 years documented experience in production of liquid-filled substation transformers.

C. Equipment and material furnished shall be subject to ANSI/IEEE factory production test and inspection by Engineer. Refer to At Factory Inspection/Witness Test article of this Section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive and off load transformer, air terminal chambers if ship separately, transformer cooling tubes, transformer air blast fans, and additional cooling liquid as required from truck. Contractor shall be responsible for costs to provide crane, provide spreader bars as required using only lifting provisions supplied by the transformer manufacturer.

B. Inspect transformer and accessory items both externally and internally for evidence of shipping and handling damage reporting accordingly to trucking company and Engineer.

C. Visibly inspect and confirm that items and accessories have been received and are in accordance with Drawings and Specifications.

D. Protect equipment in secure place during storage prior to placing equipment on concrete pad.

1.8 OPERATION AND MAINTENANCE MANUAL

A. Installation, operating, and maintenance instructions shall cover equipment furnished including transformer, automatic load tap changer with controls, temperature control equipment, and accessory devices. Provide 2 hard copies, 5 AutoCAD, and 1 electronic file in PDF format on external "As-Built" set within 2 weeks after energization and final system commissioning of manual.

PART 2 – PRODUCTS

2.1 TRANSFORMER

A. Transformer shall consist of primary full height air terminal chamber (ATC) for bottom entry 38kV cable termination (2 per phase) using compression lugs and space for 38kV stress cone terminals. Provide three 45kV intermediate class surge arresters. Provide copper ground bus for grounding and connection of incoming ground wires from upstream circuit breaker equipment.

B. Secondary air terminal chamber (ATC) shall consist of full height ATC for bottom entry of 11kV/6.6kV cable terminations using compression lugs, 4 cables per phase for 11 kV. For 6.6kV, provide cable termination provisions using copper compression lugs, 10 cables per phase. Provide copper ground bus for grounding and connection to downstream metal-clad switchgear.

1. Provide single phase control power transformer (CPT) with primary and secondary overcurrent protection mounted in secondary ATC. See rating as indicated on Drawings.

C. Substation type transformer, mineral oil-filled manufactured in conformance with IEEE standards listed in References Article of this Section. Transformer shall be certified to UL requirements and be UL listed.

1. Transformer shall have side wall mounted primary and secondary bushing terminations.

2. Average temperature rise of winding measured by the resistance method, shall be 65 degrees Celsius (C) when transformer is operated at rated kVA output in a 30 degree C average 24 hour ambient and maximum 40 degrees C ambient, as defined by IEEE C57.12.00 without loss of service life expectancy.

3. Coolant and insulating liquid shall be inhibited mineral oil in conformance with ASTM D3487.

4. Terminations shall be side wall mounted on bushing within air filled terminal chambers on both high and load side for cable entrance and exit.

5. Primary and secondary locations shall be as follows: primary ANSI segment 2, i.e. to observers left when facing the transformer front, secondary ANSI segment 4, i.e. to observers right when facing transformer front.

6. Bussing location and phase rotation shall be coordinated with existing remote located primary and secondary switchgear to provide correct alignment and phase rotation when cable connections are completed in the field.

7. Transformer rating shall be 18 MVA/24/30 MVA, ONAN/ONAF/ONAF with 2-stage fan cooling controls.

    a. Primary voltage shall be 34.5 kV delta connected.

    b. Secondary voltage shall be 11,000/6,351 LVI and 6,600/3,810 LV2 wye tapped secondary with bushings XO, XI, X2, X3, X4, X5, and X6.

    c. Primary 34.5 kV delta connected winding shall include automatic load tap changer Type VRLTC as manufactured by Hitachi, 33 steps 5/8 percent 16 0plus, 16 minus. Refer to Load Tap Changer Article of this Section for details.

    d. Primary BIL 200 kV.

    e. Secondary BIL 110 kV.

    f. Impedance shall be 5 percent with ANSI tolerance of plus or minus 7-1/2 percent.

    g. Sound level shall be less than values specified in NEMA TR 1 for liquid-filled transformers.

8. Transformer shall be of sealed tank construction of sufficient strength to withstand a pressure of 15 pounds per square inch (psi) without permanent distortion. Cover shall be welded to tank. Provided 2 hand hole covers with hand hole covers with gaskets. If required, transformer panel coolers that are removable shall be furnished with shut off valves. Air blast fans with safety cage for two stage fan cooling may be removable for shipment complete instruction shall be provided for Contractor field installation of panel coolers and air blast fans including wiring details and connections to junction boxes. Provide filing provision instructions for removable panel coolers with sufficient amount of mineral oil. Provide transformer lifting and handling instructions.

9. Transformer winding shall be wound with copper conductor.

10. Coils shall be wound with copper conductor.

11. Core shall be fabricated of high grade grain oriented silicon steel laminations carefully annealed after fabrication to restore high magnetic permeability. Magnetic flux density shall be kept well below the saturation point.

12. Tank, cooling tubes, cooling fans and safety cage, preventive auto transformer enclosure, oil filled tap changer compartment, tap changer motor drive compartment and control cabinet shall be finished with manufacturer’s standard preparation, primed and 2-step paint catalyzed process with polyurethane top-coat. Total thickness shall not be less than 3 mils. Paint color shall be ANSI 61 to match color of existing switchgear.

13. Furnish the following accessories:

    a. 1-inch upper filling plug and filter press.

    b. 2-inch drain valve/lower filter press connection with sampler.

    c. Liquid temperature gage with alarm contact.

    d. Magnetic liquid level gage with alarm contact.

    e. Vacuum pressure gage with air test valve and sealed air valve and alarm contact.

f. Pressure relief diaphragm with alarm contact and semaphore.

g. 2 rapid pressure rise relays: 1 on transformer main tank, 1 on load tap changer oil tank. Each rapid rise pressure relay shall have 1 form C output contact and 1 normally open trip contact wired to terminal blocks in control cabinet. Trip contacts shall be coordinated with secondary switchgear manufacture PLC to provide trip signal via Port of Los Angeles fiber network to trip transformer primary 34.5kV metal-clad circuit breaker and lock it open position through breaker device 86 lockout relay.

14. Transformer shall be designed and furnished with 2- stage fan cooling system for 24/30 MVA. Fan control system shall be controlled with intelligent transformer monitor, Model 509-100 as manufactured by Qualitrol. Device shall include communications capability of RS-485 and digital Ethernet via fiber optic system for connection to secondary switchgear system. Fan control shall be activated by transformer winding temperature system. Include temperature sensors, motor starter for fan motors, test modes of operation of fans with safety cage, and fan motors. Fan motors shall be 240 volt single phase 60 Hz with power supplied from control power transformer in secondary air terminal chamber.

15. Testing shall be conducted in conformance with IEEE C57.12.91 and shall include at a minimum the following tests:

    a. Ratio

    b. Polarity

    c. Phase rotation

    d. Excitation current

    e. Impedance voltage

    f. Load loss (no load + load loss = total losses)

    g. Applied potential

    h. Induced potential

    i. Quality control Impulse

    j. Temperature (typical data from previous unit is acceptable)

k. Sound (typical data from previous unit is acceptable)

l. External hardware shall be stainless steel with silicon bronze nuts.

m. Wiring shall be in rigid conduit with short runs of flexible metal conduit.

2.2 LOAD TAP CHANGER (LTC) EQUIPMENT

A. Load tap changer (LTC) equipment shall meet the requirements of IEEE C57.131 and IEC 60214-1. Locate LTC in segment 1 on transformer tank in conformance with IEEE C57.12.10. LTC shall be Type VTLTC 2000-200 as manufactured by Hitachi.

B. Potential for the voltage regulating relay shall be obtained from external, 120Vac, single phase secondary metal-clad switchgear. This consists of 3 voltage transformers on the supply side of main breakers. Voltage transformers shall be connected in wye grounded configuration. Transformer is provided with tapped secondary 11,000/6,351 and 6,600/3,810 volts, voltage transformer ratio is 7,200 to 120 volts and shall be connected to X4 and X5 to provide the required 120Vac input to the voltage regulating relay. Selection of 11kV or 6.6kV input shall be controlled at secondary main breakers. Drive power for the mechanism shall be provided from control power transformer in the transformer secondary air terminal chamber. Grounding of control power transformer is provided in the secondary air terminal chamber and grounding of the voltage transformers is provided at the secondary metal-clad switchgear. No other grounds shall be imposed on the potential circuit.

C. Transformer is provided with tapped secondary 11,000/6,351 and 6,600/3,810 volts, control connection only 1 grounding resistor for appropriate system voltage to XO terminal.

D. Load tap changer shall be reactance type with vacuum diverter arcing tap switch. Resistor type arcing tap switch is unacceptable.

E. Connect load tap changer in the delta connected 34.5kV primary windings and locate in a separate enclosed compartment that does not share oil or headspace with main tank. The regulating winding shall be electrically independent from high and low voltage main windings. Taps shall be fully distributed.

F. The preventive auto and series transformer shall be power class, round core/round coil construction using copper conductor.

G. Load tap changer shall provide plus 10 percent voltage regulation in thirty two 5/8 percent steps with 16 steps above normal and 16 steps below nominal voltage. Transformer shall be capable of delivering rated MVA at the nominal low voltage tap and on taps above nominal rated voltage. Transformer shall be capable of delivering reduced MVA on taps below nominal low voltage.

H. A mechanical pressure relief device, Qualitrol Model No. 208-60P shall be provided on the LTC cover that has mechanized target operation, visible from the ground. The mechanical pressure relief device shall have on normally open/normally closed form C contact and 1 normally open trip contact which operate at 5 psi. The mechanical pressure relief device shall be connected to a test switch and slide link terminal blocks in the main control cabinet.

I. LTC switch internal components shall be accessible from a single hinged door with a maximum width of 60 inches mounted on the front of the LTC compartment.

J. The load tap changer mechanized position indicator shall be indexed 16L-N-16R. The manual reset of the drag pointer on the LTC position indicator shall be resettable by a person standing at the transformer base. The indicator shall be clearly visible when operating the manual raise-lower control switch. If the tap position indicator drag hands are reset electrically, a nameplate shall be placed on the position indicator door that reads: “Use Electric Reset in LTC Control Compartment”.

K. An LTC pressure switch shall be supplied on the LTC compartment for free breathing LTC designs only. When the manufacturer requires and supplies an LTC pressure switch on the LTC compartment, the press switch output contact shall be connected to an auxiliary relay with at least 3 normally open contacts. One auxiliary contact shall be wired to a white indicating light in the LTC control cabinet. One contact shall be used as a seal-in feature and shall be included with a push button next to the light to clear the alarm. The indicating light shall be labeled “LTC PRESSURE SWITCH OPERATED” and the push button shall be labeled “LTC PRESSURE SWITCH RESET”. The other auxiliary contact(s) shall be wired through a test switch to a slide link terminal block in a main control cabinet to be connected to SCADA alarm.

L. If the LTC manufacturer has a limitation that its LTC is not to be hand crank operated with transformer energized, then at the receptacle for the hand crank device, a red nameplate (approximately 2 inches by 4 inches) with white letters shall be furnished with the following description:

1. "DANGER DO NOT HAND CRANK WITH TRANSFORMER ENERGIZED"

M. LTC nameplate shall be in conformance with IEEE C57.12.10 and shall include:

1. LTC rating
2. Manufacturer and Model Number of the mechanism
3. Year of manufacture
4. Maximum rated current of the mechanism
5. Gallons of oil in the mechanism compartment
6. Series Transformer Ratio
7. Basic Insulation Level (BIL)

N. The LTC compartment shall be capable of withstanding full vacuum without damage to the LTC compartment or components, whether the main tank is at full vacuum or not and whether it is filled with oil or not.

O. Manufacturer shall supply contact life curve of LTC mechanism with proposal and Instruction Book.

P. Load tap changer control features shall include:

1. The voltage regulating relay shall be Model M-2001D tap changer control as manufactured by Beckwith Electric Company.
2. An operation counter to count each time a tap change takes place.
3. Downloadable event log to allow Engineer to view the operation data for the history of the service life of the LTC.
4. If the LTC utilizes vacuum interrupters, there shall be a monitoring system which detects current before and after the vacuum interrupter opens.

2.3 DIGITAL TAP CHANGER CONTROL FOR TRANSFORMERS

A. Digital tap changer control for 18-24-30 MVA transformer with Hitachi VRLTC automatic load tap changer shall be Model M-2001D as manufactured by Beckwith.

1. Surge withstand capability: IEEE C37.90.1

2. Surge Immunity: IEC 60255

3. Compliance: cULus-Listed equipment in conformance with 508.

4. Atmospheric Environment: IEC 60068

B. Digital tap changer control for transformers shall contain the features listed in Beckwith information bulletin. It shall include adjustable bandcenter, adjustable bandwidth and communications software S-2001D Tap Talk in USB format. Capability shall be provided for tap setting of 4 profiles with adjustable time delay between tap settings at secondary voltage LV1 and LV2.

C. Digital tap changer control shall have COM 1 (top) RS-485 and fiber optic port (ST and V-pin connectors with 62.5 and 200 micro fiber supported). Communication protocols shall include DNP 3.0, MODBUS and IEC 61850. Optional Ethernet Port COM 3 (10/100 Base T) shall be furnished through a RJ-45 jack or ST fiber on top of M-2001D. This port shall support DNP over TCP/IP, MODBUS over TCP/IP, and IEC 61850 over TCP/IP.

D. Additional Accessory Items: M-2270B adapter panel, M-2025D current loop interface, and M-2026 backup power supply as manufactured by Beckwith.

2.4 CERTIFIED TEST REPORTS

A. Furnish to Engineer manufacturer’s certified test reports conducted in conformance with IEEE C57.12.91 . Copies of certified test reports shall be provided within 2 weeks after transformer is shipped.

2.5 AT FACTORY INSPECTION/WITNESS TEST

A. Department reserves the right to inspect the transformer during manufacture and prior to shipment. After IEEE production tests have been completed and any deficiencies and wiring errors corrected, the tests shall be made available for witness test by Contractor and Engineer. Manufacturer shall provide a qualified technician and test equipment, control power source for the length of time required to perform these tests. Manufacturer shall advise in writing a minimum of 2 weeks prior to date for witness tests and length of factory time required for tests. Witness tests shall include operation of automatic load tap changer and accessory items. Refer to ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION Section for requirements.

2.6 CONCRETE PAD

A. Concrete work shall be as specified in CONCRETE FOR EXTERIOR IMPROVEMENTS Section and in accordance with Drawings.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify field measurements are as shown on approved shop drawings.

B. Examine conditions that may affect installation.

3.2 INSTALLATION

A. Assembly of the transformer in the field by Contractor shall consist of unloading, setting, aligning, leveling, and fastening the unit to the concrete pad, connecting bus work and attaching power and control cables at appropriate terminals. Contractor shall be responsible of connecting transformer cooling tubes and 2 stage cooling fans when shipped separately in conformance with manufacturer’s written instructions. Additional oil shall be shipped separately for cooling tubes and Contractor shall be responsible for adding the additional oil in conformance with manufacturer’s written instructions.

B. Install transformer in conformance with manufacturer’s written instructions, applicable requirements of National Electrical Code (NEC) and in accordance with industry practices and approved shop drawings.

C. Assemble air terminal chambers (ATC) (if shipped separately), transformer cooling tubes, and transformer cooling fans with cabling to junction boxes. Bus connections to transformer bushings from air terminal chambers shall be installed and torqued in conformance with manufacturer’s written instructions.

D. Complete primary and secondary cable connections, in conformance with industry practices, NEC cable bending radius and required cable terminations with stress cones for shielded cable termination requirements. Stress cones terminations shall be tested by a testing company experienced in field testing requirements. Test reports shall be provided to Engineer.

E. Low Voltage Control Wiring, CAT6, Fiber Optic and Serial Communications interconnect cables to secondary switchgear shall be installed as part of the Work.

F. Verify that primary cable connections have been completed for surge arresters after testing have been completed and before transformer is energized.

G. Mount transformer on concrete pad as detailed on Drawings. Seal voids around conduit openings in slab with Engineer-approved water and oil resistant calking or sealant.

3.3 FIELD QUALITY CONTROL

A. Secure, pay for, and engage transformer manufacturer’s field service organization for field inspection and field engineering services, product certification, quality assurance, and warranty verification of the equipment. A complete report shall be furnished to Engineer. Refer to ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION Section for requirements.

B. Engage secondary switchgear manufacturer’s factory engineers and engineering services organizations to provide detailed drawings, installation instructions, and coordination with EPM in secondary switchgear, and connection to existing Department's fiber optic system to Engineer. Provide for tripping 34.5kV transformer feeder breaker in the event of either transformer sudden pressure relay activation. Testing of complete system shall be completed with test reports furnished to Engineer.

C. Engage primary and secondary switchgear manufacturer’s factory engineers and engineering services organizations to reset primary 34.5kV feeder breaker and secondary main breaker relays based on short circuit current, protective device, and coordination study.

3.4 REPAIRS

A. Repair paint chips and scratches with manufacturer specified paint.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Circuit breaker switchgear.

1.2 RELATED SECTIONS

A. Section 26 05 29 - Hangers and Supports for Electrical Systems

B. Section 26 05 48 - Vibration and Seismic Controls for Electrical Systems

C. Section 26 08 02 - Electrical Systems and Products Manufacturer's Certification, Quality Assurance, and Warranty Verification

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 C12.1 - Electric Meters - Code for Electricity Metering.

B. IEC 60051-1 - Direct Acting Indicating Analogue Electrical Measuring Instruments and Their Accessories - Part 1: Definitions and General Requirements Common To All Parts.

C. IEC 60051-2 - Direct Acting Indicating Analogue Electrical Measuring Instruments and Their Accessories - Part 2: Special Requirements for Ammeters and Voltmeters.

D. IEEE C37.09 - IEEE Standard Test Procedures for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000 V.

E. IEEE C37.20.2 - IEEE Standard for Metal-Clad Switchgear.

F. IEEE C57.13 - IEEE Standard Requirements for Instrument Transformers.

1.5 SUBMITTALS

A. Submit the following to Engineer within 14 Calendar Days of Notice to Proceed (NTP):

1. Shop Drawings: Indicate electrical characteristics and connection requirements, outline dimensions, connection and support points, weight, specified ratings and materials.

    a. Identify mounting conditions required for equipment seismic qualification.

2. Product Data: Provide electrical characteristics and connection requirements, standard model design tests, and options.

B. Manufacturer's equipment seismic qualification certification.

C. Test Reports: Indicate procedures and results for specified factory and field testing and inspection.

D. Manufacturer's written instructions.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Manufacturer's Field Reports: Indicate activities on site, final adjustments and overcurrent protective device coordination curves, adverse findings, and recommendations.

G. Project Record Documents: Include copy of manufacturer's certified drawings.

H. Operation Data: Include operating instructions for manually and electrically opening and closing circuit breakers.

I. Maintenance Data: Include maintenance instructions for cleaning methods; cleaning materials recommended; instructions for circuit breaker removal, replacement, testing and adjustment, and lubrication.

J. Maintenance Materials: Furnish the following for Department's use in maintenance of project.

1. Tools: One each of every special tool required to operate and maintain switchgear.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect products from weather and moisture by covering with heavy plastic or canvas and by maintaining heating within enclosure in conformance with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 DESCRIPTION

A. Switchgear: IEEE C37.20.2, metal-clad switchgear assembly including horizontal draw-out circuit breakers in free-standing cubicles formed into an integrated structure.

2.2 SERVICE CONDITIONS

A. Meet requirements for usual service conditions described in IEEE C37.20.2 and for the specified unusual service conditions.

B. Meet requirements for use as service disconnecting means.

2.3 RATINGS

A. Voltage and Insulation Levels: Comply with IEEE C37.20.2.

2.4 CIRCUIT BREAKERS

A. Circuit Breaker: IEEE C37.09, vacuum interrupter type.

B. Circuit Breaker Operator: Spring-charged stored energy with electric operator.

2.5 PROTECTIVE RELAYS AND INSTRUMENTS

A. Current Transformers: IEEE C57.13, 5 ampere secondary, wound type, with single secondary winding and secondary shorting device, primary/secondary ratio as required, burden consistent with connected metering and relay devices, 60 Hertz.

2.6 FABRICATION

A. Construction: Outdoor.

B. Main Bus: Aluminum.

2.7 AT FACTORY INSPECTION/WITNESS TEST

A. Department reserves right to inspect the switchgear during manufacture and prior to shipment. After IEEE production tests have been completed and any deficiencies and wiring errors corrected, the tests shall be made available for witness test by Contractor and Engineer. Manufacturer shall provide a qualified technitian and test equipment. Manufacturer shall advise in writing a minimum of 4 weeks prior to date for witness tests and length of factory time required for tests. Witness tests shall include that the switchgear and its component operate as designed and as specified. Refer to ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION Section for requirements

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated on shop drawings.

3.2 INSTALLATION

A. Install in conformance with IEEE C37.20.2

3.3 FIELD QUALITY CONTROL

A. Air Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.3. Tests listed as optional are not required.

3.4 CLOSEOUT ACTIVITIES

A. Demonstrate operation of circuit breakers.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Medium-voltage air interrupter switches.

B. Medium-voltage fuses.

1.2 RELATED SECTIONS

A. Section 26 05 29 - Hangers and Supports for Electrical Systems

B. Section 26 05 48 - Vibration and Seismic Controls 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. IEEE C2 - National Electrical Safety Code(R) (NESC(R)).

B. IEEE C37.20.3 - IEEE Standard for Metal-Enclosed Interrupter Switchgear Rated above 1 kV AC up to and Including 48.3 kV AC.

C. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems.

D. NFPA 70 - National Electrical Code.

1.5 SUBMITTALS

A. Shop Drawings: Indicate outline dimensions, enclosure construction, shipping splits, lifting and supporting points, electrical single line diagram, and equipment electrical ratings.

1. Identify mounting conditions required for equipment seismic qualification.

1.6 QUALITY ASSURANCE

A. Products: Listed, classified, and labeled as suitable for the purpose intended.

B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect interrupter switches from weather and moisture by covering with heavy plastic or canvas and by maintaining heating within enclosure in conformance with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. ABB: www.electrification.us.abb.com/.

B. Eaton Corporation: www.eaton.com/.

C. Schneider Electric: www.se.com/.

2.2 AIR INTERRUPTER SWITCHES

A. Description: IEEE C37.20.3, switchgear assembly of individual air interrupter switches in free-standing cubicles, securely bolted together to form an integrated structure, suitable for installation where accessible by general public.

B. Enclosure: Weatherproof.

1. Include continuous ground bus through switchgear assembly, securely connected to frame of each cubicle.

2. Finish: Manufacturer's standard baked enamel paint 2 mils thick.

2.3 COMPONENTS

A. Interrupter Switch: Nonfused two position load interrupter switch.

2.4 MEDIUM-VOLTAGE FUSES

A. Description: Enclosed current limiting, non-expulsion type suitable for use indoors in enclosure.

B. Fuse Rating: E rated fuse, size as indicated.

C. Voltage: 2.4 kV.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in conformance with manufacturer's written instructions.

3.2 FIELD QUALITY CONTROL

A. Inspect and test in conformance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.5.1.2.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Medium-voltage metal-enclosed switchgear with human machine interface (HMI).

B. Electrical Power Monitoring (EPM) system shall employ same hardware and software as Department's existing EPM. New EPM netowrk and equipment shall interface and be completely compatible with the existing EPM network and components of the installed EPM base.

C. Refer to Manufacturer Article of this Section for requirements on manufacturers of 15 kV metal enclosed switchgear, EPM, and other electrical products.

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 08 02 - Electrical Systems and Products Manufacturer's Certification, Quality Assurance, and Warranty Verification

C. Section 26 09 13 - Electrical Power Monitoring (EPM)

D. Section 26 13 36 - 15 kV Metal-Clad Switchgear

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 B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.

B. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

C. IEEE C37.20.2 - IEEE Standard for Metal-Clad Switchgear.

D. IEEE C37.20.3 - IEEE Standard for Metal-Enclosed Interrupter Switchgear Rated above 1 kV AC up to and Including 48.3 kV AC.

E. IEEE C57.13 - IEEE Standard Requirements for Instrument Transformers.

F. ISO 9000 - Quality Management Systems -- Fundamentals and Vocabulary.

G. ISO 9001 - Quality Management Systems — Requirements.

1.5 SUBMITTALS

A. Submit the following to Engineer within 14 Calendar Days of Notice to Proceed (NTP):

1. Submit to Engineer for review prior to fabrication, switchgear shop drawings showing general arrangement, single line diagram, switchgear elevation, switchgear floor plan arrangement, switchgear sectional views, main and feeder breakers schematic drawings, control wiring diagrams, and terminal blocks arrangement. These drawings shall provide installation and coordination data required for the preparation of electrical and mechanical details necessary for the installation of the switchgear.

B. Manufacturer’s parts list, operation manual, descriptive bulletins, and maintenance manual.

C. Certification that the equipment meets City of Los Angeles Electrical Code.

D. Test data for the integrated equipment short circuit ratings per sections.

E. Short circuit analysis and coordination study of overcurrent protective devices for approval along with the switchgear submittals. Submittals shall be approved and stamped by a State of California registered electrical engineer.

F. Reports:

1. Present tests results in an indexed engineering report. Provide2 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.

1.6 QUALITY ASSURANCE

A. Manufacturer shall be ISO 9000, ISO 9001, and ISO 14001 certified to demonstrate quality compliance and responsible environmental management.

B. Switchgear assembly manufacturer shall be the same manufacturer of the structure, and major components including the load interrupter switch within the assembly.

C. Manufacturer shall have produced similar electrical equipment for a minimum period of 5 years. When requested by Engineer, provide an acceptable list of installations with similar equipment demonstrating compliance with this requirement.

D. Equipment shall be installed in conformance with manufacturer's written instructions and Drawings.

E. Provide the services of a qualified, factory-trained manufacturer's factory engineer to assist in the installation and start-up of the equipment specified in this Section. Manufacturer's factory engineer shall provide technical direction and assistance in general assembly of the equipment.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Handle and store equipment in conformance with manufacturer’s written instructions. A copy of these instructions shall be included with the equipment at time of shipment.

B. Shipping groups shall be designed to be shipped by truck, rail, or ship. Bolt shipping groups to skids.

C. Switchgear shall be equipped to be handled by crane. Where cranes are not available, switchgear shall be suitable for skidding in place on rollers using jacks to raise and lower the groups.

D. Switchgear being stored prior to installation shall be stored so as to maintain the equipment in a clean and dry condition. If stored outdoors, outdoor gear shall be covered and heated.

1.8 WARRANTY

A. Warrant switchgear parts and service for 1 year from the date of energization or 18 months from date of shipment by manufacturer, whichever comes first.

1.9 SEISMIC REQUIREMENTS

A. Switchgear shall be seismically qualified to comply with City of Los Angeles Building Code latest requirements. Provide Seismically Qualified Certificates for each switchgear lineup.

1.10 ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION

A. For electrical systems and products manufacturer's field engineering services, standards compliance certification, quality assurance, warranty verification, training, and prefabrication document review meeting and inspection verification meeting requirements, refer to ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION Section.

1.11 OPERATION AND MAINTENANCE MANUAL

A. Contractor shall furnish 2 hard copies, 5 AutoCAD, and 1 electronic file in PDF format on external flash drive of the installation, operating, and maintenance instructions 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.

B. Verify that primary cable connections for surge arresters have been completed with proper spacing between conductors.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. The 15 kV medium voltage metal enclosed switchgear shall be HVL Load Interrupter as manufactured by Square D.

B. The manufacturer of 15 kV metal-enclosed switchgear shall be the same manufacturer as 5kV metal-clad switchgear, 15 kV metal-clad switchgear, medium voltage transformers, and the electrical power monitoring systems.

2.2 LOAD INTERRUPTER SWITCHGEAR FABRICATION AND REQUIREMENTS

A. The outdoor, non-walk-in, metal enclosed switchgear is intended for use on 15 kV, 11 kV, or 6.6 kV as shown on the single line drawings, for 3-phase, 3-wire Delta, ungrounded, 60 hertz (Hz) system.

B. Main bus shall be tin-plated copper, non-insulated, rated 1200 amperes, and is to be supported on National Electrical Manufacturers Association (NEMA) Class A-20 porcelain standoff insulators.

C. Construction: Each equipment bay shall be a separately constructed cubicle assembled to form a rigid freestanding unit. Minimum sheet metal thickness shall be 11 gage steel on exterior surfaces. Adjacent bays shall be securely bolted together to form an integrated rigid structure. Front and rear doors shall be hinged with 3-point latches and padlock provisions. Each individual unit shall be braced to prevent distortion, and shall conform to seismic requirements in conformance with City of Los Angeles Building Code.

D. A viewing window shall be installed in a fixed panel of the enclosure to enable visual inspection of the disconnect blades from outside the enclosure.

E. Main bus and ground bus shall be drilled to allow for future extensions. Cutout areas with removable bolted on covers shall allow for future extension of the main bus. A knock-out shall be removable for the extension of the ground bus.

F. Outdoor units shall be rated NEMA 3R and shall be designed with a sloped, drip-proof roof. The cubicles shall have a door-in-door construction. The outer door shall be a bulkhead type door with three-point latching and vault type handle with provisions for padlocking. Cubicles shall be designed to allow front and rear access and shall not require the routing of line side or load side connections in front of the switch compartment.

G. Metal-enclosed switchgear shall be fully assembled, inspected and tested at the factory prior to shipment. Large line-ups shall be split to permit normal shipping and handling as well as for ease of rejoining at Project Site.

H. No energized parts shall be within normal reach of the opened doorway. Four full-length vertical barriers of 3/16-inch thick glass-reinforced polyester, NEMA grade GPO-3, minimum, shall isolate the 3 phases of the load interrupter switch and mechanism from each other and from the enclosure.

I. Dimensions: Standard dimensions per outdoor section are: 38 inches wide by 97 inches high by 60 inches deep. Outdoor equipment dimensions shall vary with enclosure style and switch/fuses selection. Maximum height shall be 109 inches for non-walk-in style enclosure, measured to peak of the sloped roof.

J. Steel parts, except galvanized (if used), shall be cleaned and a zinc-phosphate (for outdoor equipment) pre-treatment applied prior to paint application. Finish shall consist of a coat of light gray (American National Standards Institute (ANSI) 61), TGIC polyester powder paint applied electrostatically to pre-cleaned and phosphatized internal and external parts. Following paint application, parts shall be baked to produce a hard durable finish. The coating shall withstand salt spray test for corrosion resistance of 2500 hours for outdoor equipment in conformance with ASTM D1654 and ASTM B117. Average thickness of the paint film shall be 2.0 mils. Paint film shall be uniform in color and free from blisters, sags, flaking, and peeling.

K. Switchgear assembly, including load interrupter switches, live-line indicators, and relays shall be factory-tested and load interrupter switches of like rating shall be interchangeable.

L. Switchgear shall consist of load interrupter switches as shown on Drawings, assembled to form a rigid, self-supporting, complete, metal-enclosed structure providing 2 thicknesses of painted steel between units.

M. Metal-enclosed switchgear with load interrupter switches shall consist of a multiple section line-up. The sections shall contain the load interrupter switches and the necessary accessory components. The equipment shall be factory-assembled (except for necessary shipping splits) and operationally checked. The assembly shall be a self-supporting, floor mounted bay.

N. In establishing the requirements for the enclosure design, consideration shall be given to such relevant factors as controlled access, tamper resistance, protection from ingress of rodents and insects, and the possibility of arcing faults within the enclosure.

O. Integrated switchgear assembly shall withstand the effects of closing, carrying, and interrupting currents up to the assigned maximum short circuit rating.

P. Rated Voltage: 15 kV, 3-phase, 3-wire

Q. Operating Frequency: 60 Hz

R. Main Bus Bracing: 40 kA asymmetrical

S. Basic Impulse Level (BIL): 95 kV

T. Power Frequency Withstand: 36 kV

U. Momentary Current Rating: 61 kA rms asymmetrical

V. Short Time Current (2 seconds): 38 kV symmetrical

W. Fault Closing Current: 61 kA rms asymmetrical

X. Integrated Bus Ampacity: 1,200 amperes, continuous current

Y. Load Interrupting Current: 1,200 amperes

2.3 COMPONENTS

A. Load Interrupter Switch:

1. Over-Center Mechanism:

a. The load interrupter switch shall be rated at 1,200 amperes continuous and interrupting; fixed mounted on NEMA Class A-20 porcelain standoff insulators; manually operated; quick-make, quick-break with the speed of operation independent of the operator. To provide for dependable operation, the device shall not rely on chains or cables to drive the blade assemblies open and closed. The spring operator assembly shall be isolated from high voltage and coupled through a direct drive shaft.

B. Switches shall separate current carrying paths and arcing interruption paths.

C. Switch blades shall be mounted on insulators that are attached to grounded metal barriers. Switches that utilize blades mounted on a common shaft with insulation from blade to blade rather than blade to ground are unacceptable.

D. The switch operating handle shall be permanently attached to the outside front of the switchgear and ready for immediate use, except for outdoor applications where the front of the switchgear shall be covered by a full-height solid door. Removable handles are not acceptable. The handle shall operate in the conventional fashion with the switch closed with the handle in the up position and the switch open with the handle in the down position. Provisions shall be available for padlocking the switch in either the open or closed position.

2.4 ACCESSORIES

A. Incoming Cable Termination: Bottom cable entry to cable lug. Bottom floor of enclosure is open. The recommended power cable entry area is 6 inches wide by 34 inches long, as shown on Drawings.

B. Provide Burndy long-barrel compression lugs for terminating cables onto the switchgear terminal pads.

C. Space Heaters: For 120 VAC internal loadcenter source, sized by the manufacturer, with thermostat and humidistat located in the HMI section.

D. Mechanical Interlocks: High-voltage compartment door shall be interlocked to prevent opening with the load interrupter in the closed position. The interlock shall be directly attached to the operating mechanism and shall not rely on long cables and linkages.

E. Kirk Key Interlocks for Each Upright Earthing Switch: Brass DM style. Provide 2 kirk key locks on the lower position of the switch mechanism. Provide 2 kirk keys to match the 2 kirk key locks on 2 shore-to-ship power receptacles on wharf (when feeding shore power receptacles). Provide 1 kirk key lock in the upper position of the earthing switch mechanism. Provide 1 kirk key to match the kirk key lock on the lower position of the adjacent inverted feeder disconnect switch mechanism.

F. Kirk key interlock for each inverted feeder disconnect switch: Brass DM style. Provide 1 kirk key lock on the lower position of the switch mechanism. Provide 1 kirk key to match the kirk key lock in the upper position of the adjacent earthing switch.

G. For power monitoring and control system requirements, refer to ELECTRICAL POWER MONITORING (EPM) Section.

H. Provide the following switchgear accessories:

1. 2a/2b auxiliary contacts on each switch mechanism wired to terminal blocks and PLC I/O in the human machine interface (HMI) section.

2. Double loadside bussed runbacks in each feeder disconnect switch section to mount bushing mounted multi ratio current transformers.

3. 2 live line indicators, 1 on the lineside and 1 on the loadside of each feeder disconnect switch section.

4. Electroswitch breaker control switch with pilot lights shall be mounted in HMI section and wired out to terminal blocks.

5. Mimic bus, kirk key interlock, and sequence of operation engraved nameplates shall be mounted on the inner doors of each section.

6. Engraved section identification nameplates shall be mounted on the outer doors of each section.
7. Provide mechanical operations counter on each switch mechanism.
8. ANSI 61 touch-up paint
9. 120V fluorescent light with wire guard and door-mounted limit switch shall be included on the inside of the outer door of each section.
10. Provide 120V GFCI duplex receptacle in the HMI section.
11. Provide a properly sized strip heater with control thermostat and humidistat in HMI section.
12. Front and rear hinged doors with 3-point latches and padlock provisions shall be on each section.
13. 120/208 VAC, 3-phase, 4-wire, 100A main circuit breaker loadcenter, with
14. 30-20A/1-Pole Circuit Breakers. Source for loadcenter shall be CPT in 15 kV metal clad switchgear.
15. Mount Ethernet switch and wire in HMI section, and shall contain 2 100BaseFX fiber optic ports, and 4-100BaseT UTP RJ-45 ports. Two of RJ-45 ports shall be wired out to HMI and front port. Ethernet switch shall be N-Tron 710FX2-ST with 24VDC power supply.
16. Provide a front-accessible Ethernet port (RJ-45 connector) for temporary local access via a laptop personal computer, suitable for use during commissioning and normal operations. This connector shall include protective cover, tethered to avoid accidental loss or damage. Port shall be wired to Ethernet switch in such a way that standard “straight-through” Ethernet cables may be used. Special “cross-over” cables shall not be required. This port shall be provided for local access only, and shall be provided in addition to the permanent Ethernet ports inside the equipment.

I. Instrument Transformers:

1. Current Transformers: The current transformer (CT) assembly shall be insulated for the full voltage rating of the switchgear. Current transformer wiring shall be Type SIS No.12 AWG. Relaying and metering accuracy shall conform to IEEE C57.13 and IEEE C37.20.2 and shall have accuracy class of C400. Each current transformer/bushing/bus assembly shall be removable and fully supported within the switchgear structure with full voltage/BIL insulator through bus bushings. Load cable connections shall be on the load side of the current transformer/bushing/bus assembly. Removal of the current transformer/ bushing/bus assembly shall not require the load cable disconnection. Current transformers shall be connected to PowerLogic P5 relays in the metal clad switchgear. CT secondary winding shall terminate in a screw type terminal on CT housing and shall be wired to shorting terminal blocks in the compartment and wired to shorting terminal blocks in the metal clad switchgear. CT wiring shall run to the feeder protection relays. For cable lengths exceeding 100 feet, use No. 8 copper AWG conductors with appropriate cable reducing blocks and terminal blocks in each feeder disconnect section, HMI section, and PLC Section of the metal clad switchgear.

2. Each inverted feeder disconnect switch shall include current transformers as shown on Drawings. Current transformers shall be 400A, ANSI rated, high accuracy, multi-ratio, bushing-mounted, and bus-connected to the load side of the feeder disconnect switch. Switchgear enclosure shall accommodate up to 6 bushing-mounted current transformers rigidly supported inside the rear of the enclosure.

J. Control Wiring:

1. Switchgear shall be wired with Type SIS No. 14 AWG; copper conductors rated 600V, 90 degrees C except where larger size wire is specified. Provide switchgear with terminal blocks for outgoing control connections. Wire markers shall be provided for each end of control wires.

K. Anchor Requirements:

1. Each equipment structure unit shall be welded directly to 12-inch wide metal leveling channels, embedded in the concrete pad. Leveling channel shall have minimum 24-inch long embedded anchoring hooks attached to steel rebar reinforcing rods. Contractor shall submit attachment details and calculations signed by a State of California registered structural engineer based on the purchased equipment.

2.5 FACTORY TESTING

A. Testing Procedures and Test Results:

1. Equipment performance test shall demonstrate to Engineer that the switchgear and its components operate as designed and as specified.

2. Production testing procedures and the recording of the test results shall comply with the standard production tests published by IEEE C37.20.3.

B. Production Tests:

1. Production tests for switchgear assemblies shall be power frequency dielectric tests, mechanical tests, grounding of instrument transformer case tests, and electrical operation and control wiring check. Furnish to Engineer a certified report of the test signed by a State of California registered electrical engineer responsible for the test. Record simultaneous load currents. Production testing shall be reviewed by Engineer.

C. Dielectric Tests:

1. Power frequency withstand tests shall be made at the factory on each switchgear assembly structure. Tests shall be made phase to phase and each phase to ground. For production tests, the removable elements need not be tested in the assembly if they are tested separately. Perform contact resistance test across each switch blade, and report any contact resistance in excess of 50 micro-ohms.

   a. PowerLogic P5 Relays:

      1) Calibrate and set the relays, for proper operation. The relays shall be set by qualified manufacturer’s representative with settings in conformance with the coordination study.

      2) 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.

2. Grounding:

   a. Measure and record the resistance of earth ground at 15 kV.

3. Coordination Curves:

   a. Provide the coordination curves for selective tripping of overcurrent devices. Redraw the curves where required due to substitution of relays or fuses other than those used in the engineering design. Exact fusing and relay setting descriptions shall be installed at each overcurrent device in a permanent manner.

   b. Mechanical Operation Tests:

      1) Perform mechanical tests to ensure the functioning of switches, removable unit operating mechanisms and mechanical interlocks. These tests shall ensure the interchangeability of removable units designed to be interchangeable.

   c. Control Wiring Continuity:

      1) The control wiring of the switchgear assembly shall be verified by the electrical operations of the component control devices.

   d. Polarity Tests:

      1) Perform tests to ensure that connections between instrument transformers, meters, or relays are correctly connected for polarities. Check instruments for correct direction.

   e. Sequence Tests:

      1) Test switchgear assemblies involving sequential operation of devices to ensure that the devices are in the sequence function in order intended.

   f. Ground Fault System Test:

      1) Conduct ground fault system test in conformance with instructions provided with the equipment. A written record of this test shall be made and shall be available to Engineer and City of Los Angeles Department of Building and Safety.

2.6 UNDERWRITERS LABORATORY FIELD EVALUATION AND CERTIFICATION

A. 15 kV metal enclosed switchgear, including but not limited to its components, housing, assembly and operation, shall be field evaluated and certified by Underwriters Laboratory field inspection services and shall be Underwriters Laboratories, Incorporated (UL) labeled.

B. Manufacturer shall coordinate and obtain UL field evaluation and certification at the factory, prior to shipment.

C. Manufacturer shall arrange necessary factory visit(s) of UL evaluation staff, pay for costs, including but not limited to UL field evaluation and certification fees, UL staff factory visit travel expenses, transportation (air and ground), lodging, and per diem costs. During the first visit UL staff shall review the switchgear and, in the event of required correction, shall submit a written correction list to the manufacturer.

D. Manufacturer shall comply with UL field evaluation correction items and shall correct the conditions in compliance with UL field evaluation requirements at no additional cost. In the event of the correction compliance requiring a follow-up UL staff factory visit, the manufacturer shall pay for costs, including but not limited to fees, travel expenses, transportation (air and ground), lodging and per diem costs for UL field staff.

E. Upon completion of the corrections, and as required by UL, manufacturer shall comply with the following:

1. Manufacturer shall obtain final UL factory field evaluation and approval certificate from UL and shall submit the original of this certificate to Engineer within 15 Calendar Days of obtaining certificate.

2. Manufacturer shall include a copy of UL factory field evaluation and approval certificate in the transformer’s operation and maintenance manual and shall submit the operation and maintenance manual in conformance with requirements of these specifications.

2.7 SHORT CIRCUIT, COORDINATION, AND ARC FLASH STUDY

A. Switchgear manufacturer shall conduct and submit short circuit, coordination power system, and arc flash studies to include coordination with the load as indicated on Drawings and shall furnish arc flash labels.

B. Switchgear manufacturer’s technician shall set the protective relay devices based on the coordination study report.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Contractor shall visibly inspect and confirm that items and accessories have been received and are in conformance with Drawings and Specifications. Verify field measurements are as shown on approved shop drawings.

B. Contractor shall verify that control power is available, external or internal, for heater circuits in outdoor NEMA 3R equipment. Heaters shall be energized to control temperature and condensation during the time equipment is not energized.

3.2 INSTALLATION

A. Work of assembly in the field by Contractor shall consist of unloading, setting, aligning, leveling, and fastening the stationary housing to the concrete slab, connecting bus Work, cables at shipping splits, and attaching power and control cables at appropriate terminals.

B. Switchgear shall be installed in conformance with manufacturer’s written instructions, applicable requirements of National Electrical Code (NEC) and in conformance with recognized industry practices.

C. Where switchgear is shipped in sections, Contractor shall assemble into a complete switchgear line-up. Primary bus connections shall be installed and torqued in conformance with manufacturer's written instructions.

D. Field-installed interconnect wiring, such as low voltage, controls, CT, communications, EPM System, and ION900T (or PLC) I/O wiring shall be continuous. Splices in field-installed interconnect wiring are not allowed.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Contractor shall secure, pay for, and deliver manufacturer’s field service organization for field inspection and testing of the switchgear.

2. Contractor shall provide detailed start-up and testing procedure based on the component material as part of the switchgear.

3. Load interrupter switches shall be operated manually to verify proper open and close positions.

4. Perform low frequency withstand test in conformance withIEEE C37.20.2 paragraph 5.5. Field test voltage shall not exceed 75 percent of factory test value of 36 kV A.C. If equipment has been stored for a long period of time during construction accumulating dust, dirt, moisture, and/or other contaminants, it shall be restored to good condition before field dielectric tests are performed.

5. Contractor shall repair paint chips and scratches with manufacturer supplied paint.

6. Contractor shall engage manufacturer’s factory engineer to set relays in conformance with the short circuit current and coordination study.

3.4 TRAINING

A. Upon acceptance of Work, provide a training session for up to 3 Department Construction and Maintenance shifts (day, evening, and night) at Project Site.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. 38 kV metal Enclosed Switchgear with utility service terminating section, voltage transformer compartment disconnect switch and fuse compartment, voltage transformer compartment, current transformer compartment, barriered utility metering and telecom compartment and customer outgoing section.

B. Equipment supplied shall be in conformance with Los Angeles Department of Water and Power (LADWP) Electric Service Requirements (ESR) Manufacturer shall be responsible for drawing submittal to LADWP and obtaining approval of submittal prior to proceeding with manufacture of equipment.

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. IEEE C37.20.3 - IEEE Standard for Metal-Enclosed Interrupter Switchgear Rated above 1 kV AC up to and Including 48.3 kV AC.

B. ISO 9001 - Quality Management Systems — Requirements.

1.5 SUBMITTALS

A. Prior to equipment fabrication, Contractor shall submit the following drawings subject to Engineer's review and approval. Contractor shall not release the equipment drawings to manufacturer for fabrication prior to obtaining Engineer’s approval. 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.

1. Submit the following to Engineer within 14 Calendar Days of Notice to Proceed (NTP):

a. Complete dimensioned assembly drawing(s) showing plan, elevation, section views, weights, and center of gravity.

b. Plan showing exact location and details for channel sill, anchor bolt locations, and terminations of power bus and control cables.

c. Elementary or schematic diagrams as required.

d. Section views and detailed dimensioned drawings of the end for future additions, if required.

e. Bill of material shall be provided listing the devices and accessories to be furnished. The bill of material shall include complete identification and description of the devices.

f. Equipment shall be shown on the cubicle wiring diagram with the same relative position as shown on the front view drawing. On the wiring diagram, the rear view shall be shown for the equipment mounted on the front of the panel where space is available on the front of the panel. Shipping splits shall be shown on drawings of cubicles affected, showing clearly connection to be made when installing the switchgear.

g. Terminal block drawings shall provide space to show purchaser’s connections.

2. Revisions to drawings shall be identified.

3. Seller shall furnish drawings for record via AutoCAD drafting system in both hard copy and electronic file.

4. One complete set of operating and maintenance instructions for each piece of equipment specified shall be furnished at time of shipment with the equipment and the balance of the operating and maintenance instructions 2 weeks after equipment has shipped. One set of “as built” drawings shall be sent within 2 weeks after equipment has been energized. "As-built" drawings shall include any red-lined field modifications from Contractor and corrections from LADWP inspector.

5. Work of assembly in the field by the electrical contractor shall consist of unloading, setting, aligning, leveling, and fastening the equipment housing to the floor, connecting bus Work, cables at shipping splits, and attaching power and control cables at appropriate terminals.

6. Equipment, apparatus, and material furnished shall be subject to American National Standards Institute (ANSI) factory production tests and inspection by purchaser’s representative (refer to witness test section).

1.6 QUALITY ASSURANCE

A. Manufacturer shall be certified ISO 9001 prior to bidding this project. Manufacturer’s Master Quality Control Manual shall be available for review at manufacturer’s facility during any visit by Engineer. Manufacturer shall be specialized in medium-voltage metal-clad and metal-enclosed switchgear with at least 5 years of documented experience.

B. Equipment shall be installed in conformance with manufacturer's written instructions and Drawings

C. Provide the services of a qualified, factory-trained manufacturer's factory engineer to assist in the installation and start-up of the equipment specified in this Section. Manufacturer's factory engineer shall provide technical direction and assistance in general assembly of the equipment.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Manufacturer shall prepare equipment for shipping and protect switchgear against damage in transit.

B. Contractor shall off load equipment on-site and inspect both internally and externally for shipping and handling damage.

C. Contractor shall receive and off load switchgear from truck providing crane and spreader bars as required, using lifting provisions and handling instructions supplied by the manufacturer.

D. Contractor shall protect equipment from weather and moisture by covering with heavy plastic (where applicable for outdoor equipment) and by maintaining heat within enclosure in conformance with manufacturer’s written instructions.

1.8 WARRANTY

A. Warranty switchgear parts and service for 1 year from the date of energization or 18 months from the date of shipment by manufacturer, whichever comes first.

1.9 ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION

A. For electrical systems and products manufacturer's field engineering services, standard compliance certification, quality assurance, warranty verification, training, and prefabrication document review meeting and inspection verification meeting requirements, refer to ELECTRICAL SYSTEMS AND PRODUCTS MANUFACURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION Section

1.10 OPERATION AND MAINTENANCE MANUAL

A. Contractor shall furnish 2 hard copies, 5 AutoCAD, and 1 electronic file in PDF format on external flash drive of the installation, operating, and maintenance instructions to Engineer. The operation and maintenance manual shall include but not 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. Verify that primary cable connections for surge arresters have been completed with proper spacing between conductros.

PART 2 - PRODUCTS

2.1 LADWP METERING SWITCHGEAR ASSEMBLY

A. Metal Enclosed metering switchgear shall consist of outdoor non walk-in National Electrical Manufacturers Association (NEMA) 3R enclosure with hinged exterior doors front and rear where indicated and intended for outdoor application only. Hinged front and rear exterior doors and interior screened doors where required shall be equipped with devices to hold the doors open at 90 degrees or more. Devices shall be permanently attached to the enclosure or doors and may be automatically or manually operated. Exterior doors shall have 3 point vault handle operated latching system. Vault handles shall have integral locking provisions for LADWP padlock with 5/16 inch diameter lock shaft and a 1 inch locking clearance. Arrangement sequence of underground service terminating pull section, voltage transformer switch and fuse compartment, voltage transformer compartment, current transformer compartment, barriered metering and telecom compartment, and outgoing customer section shall be in conformance to LADWP ESR. Switchgear shall be factory assembled except for necessary shipping splits and operationally checked at the factory. The assembly shall be self supporting for mounting on a concrete pad. Bus spacing and clearance shall be determined by the manufacturer except for those listed around voltage transformers and current transformers.

B. Switchgear bus bracing support system shall be equal to or exceeding 40 kA rms symmetrical. Switchgear shall be suitable for connection to LADWP 34.5 kV service voltage and meeting the requirements of LADWP ESR. Underground Service Terminating Pull Section. Bus supports shall be porcelain.

C. System voltage is 34.5 kV nominal, 3 phase 3 wire solidly grounded. Maximum design voltage of switchgear shall be 38 kV.

D. Impulse withstand Basic Impulse Level (BIL) shall be 150 kV minimum.

E. Power frequency withstand shall be 80 kV, 60 cycle, 1 minute test phase to phase and phase to ground.

F. Main bus ampacity shall be 1200 amperes continuous. Bus shall be silvered copper. Provide continuous ground bus in the sections. Customer grounding shall not be located in any of the LADWP sections.

G. Temperature rise shall comply with ANSI requirements, 65 degree C rise over maximum ambient temperature of 40 degree C inside the enclosure.

H. Space heaters and associated wiring may be installed in LADWP sections. Entry of supply power shall be in customer section along with thermostat control. No other wiring or devices shall be installed in LADWP metering sections.

2.2 COMPONENTS

A. Underground Service Termination Section:

1. Section shall include provisions for terminating LADWP incoming cables with cable support and facilities for safety ground installation. Section shall comply with LADWP ESR requirements.

2. One cable termination provisions shall be provided for each phase consisting of two 1/2 inch steel bolts extending 1-1/4 to 1-1/2 inches above bus landing surface spaced 1-3/4 inches vertical centers.

3. Each bolt shall be secured in place so that it shall not turn, back out, or loosen when tightening or loosening the nuts.

4. Each bolt shall be furnished with either a nut, split ring, and flat washer or Belleville washer and nut assembly. If Belleville washer and nut assembly are provided, torque label shall be provided readily visible near the terminating provisions.

5. Terminating provisions shall be centered relative to the compartment access opening. Phase to phase and phase to ground clearances shall be manufacturer’s standard meeting the 150 kV BIL requirement and the 80 kV dielectric withstand test.

6. Termination facilities shall be clearly and permanently identified with phase designations in block lettering.

7. Terminating provision height above enclosure bottom (this does not include NEMA 3R base channel height) shall be 78 inches minimum, 84 inches maximum to the upper terminating bolt centerline. LADWP shall supply and install cable termination lugs.

8. Provide 1 piece of Unistrut P-1000 for support of service supply cables. Top of channel shall be located 42 inches high above enclosure bottom (this does not include height of NEMA 3R base channel height). Channel

location and clearance dimensions to enclosure frame shall comply to LADWP ESR requirements.

9. Facilities for grounding shall be provided as follows:

    a. Provide safety grounding ball stud (1/2 inch – 13 threads with insulating cover) on each phase bus located directly above each terminating provision with sufficient clearance to allow installation of incoming lug by LADWP.

    b. Face ball studs toward access opening with minimum clearance of 14 inches from ball stud cover to inside of screened safety door.

    c. Position ground ball studs so hot stick and grounding hardware shall not cross over phase bus during installation process.

    d. Ground bus shall be extended forward on either side of enclosure inside screened door and equipped with bar type ground bail for attaching safety grounds. A ground ball stud may also be used.

    e. Provide two No. 6 to 250 kcmil mechanical lugs on front of ground bus extension marked "GROUNDING POINT FOR UTILITY USE ONLY".

10. Enclosure exterior access doors shall be equipped with a single padlockable vault handle with 3 point latching system equipped with either automatically or manually operated devices to hold the door open at 90 degrees or more. Devices shall be permanently attached. Handle padlock provision shall accept LADWP padlock having 5/16 inch diameter lock shaft and a 1 inch locking clearance.

11. Where enclosure exterior covers are used and door access isn’t required, covers shall be secured using tamperproof hardware.

12. Provide an interior screened door secured with mechanical fasteners and have handles sized for full gloved hand grasping. Provide screened door with permanently attached device to hold door in open position at 90 degrees or more.

13. Enclosure doors and interior screened door shall provide full access to incoming terminations without interference from any enclosure parts.

B. Voltage Transformer, Disconnect Switch, and Fuse Section:

1. Section shall include 3 compartments, Voltage Transformer disconnect Switch, Voltage Transformer Fuses and Voltage Transformers.

2. Front and rear access is required and shall be in conformance with LADWP ESR.

3. Voltage Transformer Disconnect Switch Requirements:

    a. Switch shall be 3 pole, gang operated, non load breaker with quick make and quick breaker manually operated mechanism.

    b. Switch shall be automatically grounded in the open position with blade/jaw arrangement. Wiping contacts are not permitted. Arcing horns, blades, and arc chutes are not permitted on non load break switches.

    c. Switch shall provide a visible air gap to verify successful disconnect.

    d. Cover over switch shall have a viewing window so that switch position, closed or open and grounded can be verified. Cover shall be independent of the fuse compartment door.

    e. Switch shall be tapped on the supply (utility) side of the metering current transformers.

    f. Switch primary contacts shall be the blade and jaw design to assure continuously adequate blade contact. Wiping contact or pressure contact designs are not acceptable.

    g. Switch operating handle shall be lockable in the closed position using LADWP padlock with 5/16 inch diameter lock shaft and 1 inch locking clearance.

    h. A key interlock system shall be provided between the voltage transformer disconnect switch handle, the voltage transformer fuse access door and the voltage transformer access door. Three keys shall be furnished, use 1 key only, 2 are spare. Key interlock system shall require voltage transformer disconnect switch to be locked open with key removable to unlock either voltage transformer fuse access door to access the fuses or voltage transformer compartment to access the voltage transformers.

4. Voltage Transformer Fuse Compartment Requirements:

    a. Fuse compartment shall be fully barriered with grounded metal barriers to isolate compartment from any energized bus or devices when voltage transformer disconnect switch is in open position. A full width and depth voltage rated insulating barrier shall be provided to isolate the fuse compartment from the voltage transformer disconnect switch.

    b. Fuse compartment access door shall be equipped with a handle on the opposite side of the hinges and be lockable with key interlock system to prevent access to the fuses without first opening the voltage transformer disconnect switch.

    c. Fuse access door shall be independent of voltage transformer disconnect switch cover.

    d. Three fuse holders shall be supplied each with 2 fuse mounting clips spaced 17-1/4 inches apart measured from clip centers and accepting fuse ferrule diameter of 1-3/5 inches.

    e. LADWP shall provide and install fuses, Cutler Hammer 38CLPT-5E. A spare fuse box shall be provided on the inside of the fuse access door for storing 3 spare fuses supplied by LADWP.

    f. Copper bussing shall be provided from the voltage transformer disconnect switch to the line side of the fuse holders and from the load side of the fuses to the voltage transformer compartment.

5. Voltage Transformer Requirements:

   a. The section width shall provide unobstructed access to the voltage transformers mounted in line per figure 2 on LADWP ESR page 4-23. Unobstructed free access shall be a minimum of 74 inches including a minimum of 13 inches clearance to any enclosure parts on each side of frame members. Angle mounting of voltage transformers is not acceptable. Voltage transformer dimensional details are on LADWP ESR page 4-30.

   b. Manufacturer shall furnish and install 2 General Electric JVT-200 or equal voltage transformers. Use of equivalent voltage transformers shall be approved by LADWP.

   c. Voltage transformer compartment shall be fully barriered with grounded metal barriers to isolate the compartment from any energized bus when voltage disconnect switch is in open position.

   d. The exterior access door to the voltage transformer compartment shall be equipped with a single padlockable vault handle with 3 point latching system equipped with an automatically or manually operated device to hold the door open at 90 degrees or more and lockable with key interlock system so that compartment cannot be entered without first opening the voltage transformer disconnect switch. Vault handle shall have padlocking provisions to accommodate LADWP 5/16 inches diameter padlock shaft with 1 inches locking clearance.

   e. A 1 inch non metallic conduit shall be furnished for secondary wiring from the voltage transformer (VT) compartment to the meter compartment junction box. Conduit shall be located above the mounting platform as shown on LADWP ESR.

   f. A lifting eye shall be provided above each voltage transformer as shown on LADWP ESR. Each lifting eye shall support a minimum of 350 pounds.

   g. A voltage transformer mounting platform shall be provided with drilling, spacing, and clearance requirements shown on LADWP ESR.

h. Copper bussing shall be supplied (cable is unacceptable) from the fuse holders to the voltage transformer compartment with landing terminals on each phase bus. Landing terminals shall consist of two 1/2 inch steel bolts extending from 1 to 1-1/2 inches from the landing surface and spaced 1-3/4 inches vertical centerlines. Bolts shall be secured in place so that they shall not turn, loosen or back out when tightening or loosening the nuts. Nut with flat washer and split ring washer or Belleville washer shall be provided. If Belleville washer and nut assembly is provided, torque label shall be provided clearly visible at the termination point.

i. Each phase bus landing terminals shall be located above the related voltage transformer terminal primary spade. Terminal location shall comply to LADWP ESR. LADWP shall provide the conductors from the landing terminals to the voltage transformers and B phase jumper between the transformers.

C. Current Transformer and Metering Compartments:

1. Current Transformer Compartment:

a. The section width shall provided unobstructed access to the current transformers mounted in line per figure 3 on LADWP ESR page 4-27. Unobstructed free access width shall be a minimum of 56 inches including a minimum 13 inches clearance to any enclosure parts to each side of frame members of door opening.

b. The compartment exterior access door shall be equipped with a single padlockable vault handle having 3 point latching system, equipped with either automatically or manually operated devices to hold door open at 90 degrees or more and lockable with LADWP padlock with 5/16 inch diameter lock shaft and a 1 inch locking clearance.

c. Furnish an interior screened door that is hinged, secured with mechanical fasteners, have handles sized for full hand grasping and equipped with device to hold door open at 90 degrees or more.

d. Furnish and install 2 General Electric JKW-7 current transformers, A and C phases. LADWP ESR pages 4-32 and 4-33 provides current transformer dimensions, spacing, and mounting requirements. A lifting eye shall be furnished above each current transformer position to assist in installation or removal of current transformers. Each lifting eye shall support a minimum of 150 pounds.

e. Bus connections for the current transformers shall be on the back side of the current transformer primary spades to facilitate easier removal of the current transformers. Current transformer shall be grounded. Bus connections for the current transformers and the current transformers shall comply to LADWP ESR.

f. Safety grounding provisions shall be provided consisting of ball studs (1/2 inch-13 threads) for attachment of safety grounds on both line and load side of current transformers. Ball studs shall be oriented toward the compartment access opening and access shall not be across or through phase busses or grounded parts. Bus shall be supported at the ball stud location preventing movement during safety ground operation.

g. Switchgear ground bus shall be extended to either the left or right side of the compartment and provided with a grounding terminal for LADWP's use. The terminal may be either a bar type (towel rack) or a ball stud identified with a with a label "SAFETY GROUNDING POINT FOR UTILITY USE ONLY". Ball studs shall be positioned to allow use of hot sticks to install or remove utility grounding harness and not be obstructed by fixed panels or frame members.

h. Provide a 1 inch non metallic PVC conduit for LADWP installation of CT secondary wiring to junction box in Metering Compartment in compliance to LADWP ESR.

2. Metering Compartment:

a. Provide metering compartment in the same section as the current transformer compartment. Access to the metering compartment shall be on the opposite side from the current transformer compartment. The width of the compartment shall be the same as the current transformer compartment. Access opening shall provide unobstructed access to metering compartment.

b. Metering compartment access door shall be equipped with a single padlockable vault handle having 3 point latching system equipped with either automatically or manually operated devices to hold door open at 90 degrees or more and lockable with LADWP padlock 5/16 inch diameter lock shaft and 1 inch locking clearance.

c. The compartment shall be fully barriered to isolate compartment from any energized bus. Top barrier may be Glastic. Rear compartment barrier shall be double steel full width and vertical height barrier with minimum of 1 inch air gap between the 2 steel barriers for mounting of metering and telecom equipment. As an alternative the rear compartment barrier may be grounded steel with 3/4 inch marine grade plywood spaced 1 inch from rear metal barrier and finished in a light color.

d. Provide a 12 inch wide, 12 inch high, 6 inch deep minimum junction box with 1 inch current transformer and voltage transformer non metallic PVC conduits terminated in the junction box. General location and clearances shall comply to LADWP ESR.

e. Provide and install meter socket panel with provisions for test block per LADWP ESR. Meter socket shall be 13 clip. Meter socket centerline above bottom of enclosure (this does not include NEMA 3R base channel) is 60 inches typical.

f. Provide 1 inch electrical PVC conduit from pull box to meter socket panel.

g. LADWP shall provide and install current transformer and voltage transformer secondary wiring, test block, and meter.

D. Customer Section: Customer section may be cable connections for customer cable connection to 38 kV metal clad equipment or bus transition to metal clad equipment. Consult Drawings and 1 line diagrams for details. Section shall contain provisions for customer grounding and external control power connection for space heaters.

2.3 FABRICATION

A. Construction Outdoor, non walk-in, NEMA 3R. Each equipment bay shall be a separately constructed cubicle assembled to form a rigid free standing unit. Minimum sheet metal thickness shall be 11 gauge steel on exterior surfaces. Adjacent bays shall be securely bolted together to form an integrated rigid structure. To assist installation, front/rear exterior doors shall be provided as required by LADWP ESR requirements. Doors shall be provided with padlockable vault handles with 3 point latching assembly. Padlocking provisions shall accept LADWP's padlock with 5/16 inch diameter lock shaft and a 1 inch locking clearance. Where bolted exterior covers are used, tamperproof hardware shall be used. Each individual unit shall be braced to prevent distortion. Doors shall be equipped with either automatically or manually operated devices to hold door open at 90 degrees or more.

B. A viewing window shall be provided on the front cover over the voltage transformer disconnect switch to enable viewing of the switch blades from outside of the enclosure, closed or open/grounded positions.

C. Torqued bolts for bus joints and direct support of any current carrying parts shall be marked with a bead of highly visible bright orange "torque seal" that shall readily show when a bolt has loosened. When Belleville washers are used, provide torque label in each section.

D. Current limiting fuse provisions only are required with Voltage Transformer Disconnect Switch. LADWP shall supply and install fuses. A full width and depth horizontal insulating barrier is required to isolate fuse compartment and disconnect switch. Access door to fuse compartment shall be key interlocked with voltage transformer disconnect switch to prevent access to fuses unless switch is open and grounded.

E. Rear door for access to voltage transformers shall be key interlock with voltage transformer disconnect switch to prevent access to voltage transformers unless voltage transformer disconnect switch is open and grounded.

F. Key interlock system to be furnished with the same key provisions. With voltage transformer disconnect switch open and locked open with key interlock, key is available to unlock either fuse access door or voltage transformer access door. Three keys to be available, use one, 2 are spare.

G. Height is 127 inches maximum including auxiliary support members on top and bottom.

H. Main bus shall be 1200 ampere silver plated copper, non insulated, and supported from the top of the enclosure mounted on NEMA class A-20 porcelain standoff insulators.

I. A continuous copper ground bus shall be provided connected to the steel frame of each section. Customer grounding provisions shall not be located in LADWP sections.

J. Outdoor units shall be designed with a sloped drip proof roof. The metal enclosed switchgear shall be fully assembled, inspected, and tested at the factory prior to shipment. Large lineups shall be split to permit shipping and handling as well as ease of rejoining at Project Site.

K. Space heaters shall be provided in each section for 120 Vac external source sized by the manufacturer. External source connection shall be in a non LADWP section.

L. Details of voltage transformers and current transformers supplied by manufacturer shall be in conformance with Specifications and meet LADWP requirements.

2.4 FACTORY FINISHING

A. Steel parts, except galvanized, shall be cleaned and a zinc phosphate pre-treatment used prior to paint application.

B. Paint color shall be ANSI 61 light gray TGIC polyester powder applied electro-statically through air. Following paint application, parts shall be baked to produce a hard durable finish. The average thickness of the paint film shall be 2.0 mils. Paint film shall be uniform in color and free from blisters, sags, flaking, and peeling.

C. Adequacy of paint finish to inhibit the buildup of rust on ferrous material shall be tested and evaluated per paragraphs 5.2.8.1-7 of IEEE C37.20.3. Salt spray withstand tests in conformance with Paragraph 5.2.8.4 shall be performed on a periodic basis to provide conformance to this corrosion resistance standard of at least 2,500 hours minimum for outdoor equipment.

D. Factory production tests see IEEE C37.20.3 Section 5.3.

E. Production tests for Metal Enclosed Switchgear shall be low frequency dielectric, mechanical operation of doors, latching mechanism, and devices to hold doors open at 90 degrees or more in conformance with LADWP requirements.

F. Voltage transformer disconnect switch shall function to ground the switch blades automatically with switch in open position.

G. Verify key interlock system functions as required between voltage transformer disconnect switch, fuse access door, and voltage transformer access door.

H. Dielectric test per 5.3.1 and general requirements of 5.2.1. For 34.5 kV switchgear, test voltage is 80 kV. Test shall be made between each phase and phase to ground for 1 minute. Leakage test values shall be recorded and included with test report.

I. Verify LADWP requirements per ESR pages 4-21 through 4-35 inclusive have been met and construction is per LADWP approved drawing submittal by manufacturer.

J. Copies of factory production test reports shall be submitted to Engineer.

2.5 SHORT CIRCUIT, COORDINATION, AND ARC FLASH STUDY

A. Switchgear manufacturer shall conduct and submit short circuit, coordination power system, and arc flash studies to include coordination with the load as indicated on Drawings and shall furnish arc flash labels.

B. Switchgear manufacturer’s technician shall set the protective relay devices based on the coordination study report.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Contractor shall visibly inspect and confirm that items and accessories have been received and are in conformance with Specifications and Drawings. Verify field measurements as shown on approved shop drawings.

B. Contractor shall verify that control power is available, external or internal, for heater circuits in outdoor NEMA 3R equipment. Heaters shall be energized to control temperature and condensation during the time the equipment is not energized.

3.2 INSTALLATION

A. Switchgear shall be installed in conformance with manufacturer’s written instructions, applicable requirements of National Electrical Code (NEC) and in conformance with recognized industry practices.

B. Where switchgear is shipped in sections, Contractor shall assemble into a complete switchgear line-up. Primary bus connections shall be installed and torqued in conformance with manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Contractor shall engage manufacturer's factory engineer for field inspection and testing of the switchgear. Manufacturer shall supply as a separate bid item pricing for start up and testing. Provide detailed start up and testing procedure based on component material as part of the switchgear. A complete report shall be furnished to Engineer and Contractor. Any discrepancies shall be corrected by switchgear manufacturer.

2. Perform low frequency withstand test in conformance with IEEE C37.20.3 paragraph 5.5. Field test voltage shall not exceed 75 percent of factory test value of 80 kV AC. If equipment has been stored for a long period of time during construction accumulating dust, dirt, moisture, and/or other contaminants, it shall be restored to good condition before field dielectric tests are performed.

3. Contractor shall repair paint chips and scratches with manufacturer supplied paint.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Medium voltage metal enclosed switchgear with air load interrupter switches.

B. Electrical Power Monitoring (EPM) shall employ same hardware and software as Department's existing EPM network and equipment and shall interface and be completely compatible with the existing EPM network and components of the installed EPM base.

1.2 RELATED SECTIONS

A. Section 09 96 20 - Corrosion Control

B. Section 26 00 01 - Basic Electrical Materials and Methods

C. Section 26 08 02 - Electrical Systems and Products Manufacturer's Certification, Quality Assurance, and Warranty Verification

D. Section 26 09 13 - Electrical Power Monitoring (EPM)

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 B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.

B. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

C. IEEE C37.20.2 - IEEE Standard for Metal-Clad Switchgear.

D. IEEE C37.20.3 - IEEE Standard for Metal-Enclosed Interrupter Switchgear Rated above 1 kV AC up to and Including 48.3 kV AC.

E. ISO 9000 - Quality Management Systems -- Fundamentals and Vocabulary.

F. ISO 9001 - Quality Management Systems — Requirements.

1.5 SUBMITTALS

A. Submit the following to Engineer within 14 Calendar Days of Notice to Proceed (NTP):

1. Submit to Engineer for review prior to fabrication, switchgear shop drawings showing general arrangement, single line diagram, switchgear elevation, switchgear floor plan arrangement, switchgear sectional views, main and feeder breakers schematic drawings, control wiring diagrams, and terminal blocks arrangement. These drawings shall provide installation and coordination data required for the preparation of electrical and mechanical details necessary for the installation of the switchgear.

B. Manufacturer's parts list, operation and instruction manual, descriptive bulletins, and maintenance manual.

C. Certification that the equipment meets City of Los Angeles Electrical Code.

D. Test data for the integrated equipment short circuit ratings per sections.

E. Short circuit analysis and coordination study of overcurrent protective devices for approval along with the switchgear submittals. Submittals shall be approved and stamped by a State of California registered Engineer.

F. Reports:

1. Present tests results in an indexed engineering report. Report shall be complete and copies furnished to Engineer for approval.

a. Provide seismically qualified certificate for each switchgear lineup.

1.6 QUALITY ASSURANCE

A. Manufacturer shall be ISO 9000 and ISO 9001 certified to demonstrate quality compliance.

B. Switchgear assembly manufacturer shall be the same manufacturer of the structure, and major components including the load interrupter switch within the assembly.

C. Manufacturer shall have produced similar electrical equipment for a minimum period of 5 years. When requested by Engineer, provide an acceptable list of installations with similar equipment demonstrating compliance with this requirement.

D. Equipment shall be installed in conformance with the manufacturer's written instructions and Drawings.

E. A qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted, and tested in conformance with the manufacturer's written instructions.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Handle and store equipment in conformance with manufacturer's written instructions. A copy of these instructions shall be included with the equipment at time of shipment.

B. Shipping groups shall be designed to be shipped by truck, rail, or ship. Bolt shipping groups to skids.

C. Switchgear shall be equipped to be handled by crane. Where cranes are not available, switchgear shall be suitable for skidding in place on rollers using jacks to raise and lower the groups.

D. Switchgear being stored prior to installation shall be stored so as to maintain the equipment in a clean and dry condition. If stored outdoors, outdoor gear shall be covered and heated.

E. Protect equipment from weather and moisture by covering with heavy plastic or canvas and by maintaining heat within enclosure in conformance with manufacturer's written instructions.

1.8 WARRANTY

A. Warrant switchgear parts and service for 1 year from the date of energization or 18 months from date of shipment by manufacturer, whichever comes first.

1.9 START UP, COMMISSIONING, AND TRAINING

A. For start up, commissioning, training, and prefabrication document review meeting and inspection/witness test meeting requirements, refer to ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION Section.

1.10 SEISMIC REQUIREMENTS

A. Switchgear shall be seismically qualified to comply with City of Los Angeles Building Code latest requirements. Provide Seismically Qualified Certificates for each switchgear lineup.

1.11 OPERATION AND MAINTENANCE MANUAL

A. Contractor shall furnish copies of the installation, operating, and maintenance instructions 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. The medium voltage (MV) metal enclosed switchgear shall be HVL Load Interrupter as manufactured by Square D, (909) 612-5400.

B. The manufacturer of MV metal enclosed switchgear shall be the same manufacturer as MV metal clad switchgear, MV transformer, and EPM systems.

2.2 LOAD INTERRUPTER SWITCHGEAR FABRICATION AND REQUIREMENTS

A. The outdoor, non-walk-in, metal enclosed switchgear is intended for use on the kV as shown. On the single line Drawings, for 3-phase, 3-wire Delta, ungrounded, 60 hertz system.

B. Main bus shall be tin-plated copper, non-insulated, rated 600 Amps, and is to be supported on NEMA Class A-20 porcelain standoff insulators.

C. Construction: Each equipment bay shall be a separately constructed cubicle assembled to form a rigid freestanding unit. Minimum sheet metal thickness shall be 11 gauge steel on exterior surfaces. Adjacent bays shall be securely bolted together to form an integrated rigid structure. Front and rear doors shall be hinged with 3-point latches and padlock provisions. Each individual unit shall be braced to prevent distortion, and shall conform to seismic requirements in conformance with City of Los Angeles Building Code.

D. A viewing window shall be installed in a fixed panel of the enclosure to enable visual inspection of the disconnect blades and blown fuse indicators from outside the enclosure.

E. Main bus and ground bus shall be drilled to allow for future extensions. Cutout areas with removable bolted on covers shall allow for future extension of the main bus. A knock-out shall be removable for the extension of the ground bus.

F. Outdoor units shall be rated NEMA 3R and shall be designed with a sloped, drip proof roof. The cubicles shall have a door-in-door construction. The outer door shall be a bulkhead type door with three-point latching and vault type handle with provisions for padlocking. Cubicles shall be designed to allow front and rear access and shall not require the routing of line side or load side connections in front of the switch compartment.

G. Metal-enclosed switchgear shall be fully assembled, inspected and tested at the factory prior to shipment. Large line-ups shall be split to permit normal shipping and handling as well as for ease of rejoining at Project Site.

H. No energized parts shall be within normal reach of the opened doorway. Four full-length vertical barriers of 3/16-inch thick glass-reinforced polyester, NEMA grade GPO-3, minimum, shall isolate the 3 phases of the load interrupter switch and mechanism from each other and from the enclosure.

I. Dimensions: Standard dimensions per outdoor section are: 60 inches wide by 128 inches high by 86 inches deep. Outdoor equipment dimensions shall vary with enclosure style and switch/fuses selection.

J. Steel parts, except galvanized (if used), shall be cleaned and a zinc-phosphate (for outdoor equipment) pre-treatment applied prior to paint application. Finish shall consist of a coat of light gray (ANSI Z55.1 No. 61), TGIC polyester powder paint applied electrostatically to pre-cleaned and phosphatized internal and external parts. Following paint application, parts shall be baked to produce a hard durable finish. The coating shall withstand salt spray test for corrosion resistance of 2,500 hours for outdoor equipment in conformance with ASTM D1654 and ASTM B117. Average thickness of the paint film shall be 2.0 mils. Paint film shall be uniform in color and free from blisters, sags, flaking, and peeling.

K. Switchgear assembly, including load interrupter switches, live-line indicators, and relays shall be factory-tested and load interrupter switches of like rating shall be interchangeable.

L. Switchgear shall consist of load interrupter switches as shown on Drawings, assembled to form a rigid, self-supporting, complete, metal-enclosed structure providing 2 thicknesses of painted steel between units.

M. Metal-enclosed switchgear with load interrupter switches shall contain the load interrupter switches and the necessary accessory components. The equipment shall be factory-assembled (except for necessary shipping splits) and operationally checked. The assembly shall be a self-supporting, floor mounted bay.

N. In establishing the requirements for the enclosure design, consideration shall be given to such relevant factors as controlled access, tamper resistance, protection from ingress of rodents and insects, and the possibility of arcing faults within the enclosure.

O. Integrated switchgear assembly shall withstand the effects of closing, carrying, and interrupting currents up to the assigned maximum short circuit rating.

P. System Voltage: 34.5 kV, 3-phase, 3-wire, solidly grounded.

Q. Maximum Design Voltage: 38.0 kV.

R. Operating Frequency: 60 Hz.

S. Maximum Short Circuit Current: 12.5kA rms symmetrical.

T. Basic Impulse Level (BIL): 150 kV.

U. Power Frequency Withstand: 80 kV.

V. Short Time Current (two seconds): 25 kA.

W. Fault Closing Current: 20 kA asymmetrical.

X. Integrated Bus Ampacity: 600 amperes, continuous current.

Y. Load Interrupting Current: 400 amperes, symmetrical.

2.3 COMPONENTS

A. Load Interrupter Switch:

1. Over-Center Mechanism:

a. The load interrupter switch shall be rated at 600 amperes continuous and interrupting: fixed mounted on NEMA Class A-20 porcelain standoff insulators; manually operated; quick-make, quick-break with the speed of operation independent of the operator. To provide for dependable operation, the device shall not rely on chains or cables to drive the blade assemblies open and closed. The spring operator assembly shall be isolated from high voltage and coupled through a direct drive shaft.

B. Switches shall separate current carrying paths and arcing interruption paths.

C. Switch blades shall be mounted on insulators that are attached to grounded metal barriers. Switches that utilize blades mounted on a common shaft with insulation from blade to blade rather than blade to ground are unacceptable.

D. The switch operating handle shall be permanently attached to the outside front of the switchgear and ready for immediate use, except for outdoor applications where the front of the switchgear shall be covered by a full-height solid door. Removable handles are not acceptable. The handle shall operate in the conventional fashion with the switch closed with the handle in the up position and the switch open with the handle in the down position. Provisions shall be available for padlocking the switch in either the open or closed position.

2.4 ACCESSORIES

A. Incoming Cable Termination: Bottom cable entry to cable lug. Bottom floor of enclosure is open. The recommended power cable entry area is 6 inches wide by 34 inches long, as shown on Drawings.

B. Provide Burndy long-barrel compression lugs for terminating cables onto the switchgear terminal pads.

C. Space Heaters: 240V rated for use on 120 VAC internal loadcenter source in each section, sized by the manufacturer, with thermostat and humidistat control.

D. Mechanical Interlocks: High-voltage compartment door shall be interlocked to prevent opening with the load interrupter in the closed position. The interlock shall be directly attached to the operating mechanism and shall not rely on long cables and linkages.

E. For EPM system requirements, refer to ELECTRICAL POWER MONITORING (EPM) Section.

F. Provide the following switchgear accessories:

1. 2a/2b auxiliary contacts on each switch mechanism wired to terminal blocks.

2. Live line indicators as required.

3. Mount engraved section identification nameplates shall be mounted on the outer doors of each section.

4. Provide mechanical operations counter on each switch mechanism.

5. ANSI 61 touch-up paint.

6. 120V fluorescent light with wire guard and door-mounted limit switch shall be included on the inside of the outer door of each section.

7. Provide 120V ground fault circuit interrupter duplex receptacle.

8. Front and rear hinged doors with 3-point latches and padlock provisions shall be on each section.

G. Control Wiring:

1. Switchgear shall be wired with Type SIS No. 14 AWG; copper conductors rated 600V, 90 degrees C except where larger size wire is specified. Provide switchgear with terminal blocks for outgoing control connections. Wire markers shall be provided for each end of control wires.

H. Anchor Requirements:

1. Each equipment structure unit shall be welded directly to 12-inch wide metal leveling channels, embedded in the concrete pad. Leveling channel shalt have minimum 24-inch long embedded anchoring hooks attached to steel rebar reinforcing rods. Contractor shall submit attachment details and calculations signed by a State of California registered Engineer based on the purchased equipment.

2.5 FACTORY TESTING

A. Testing Procedures and Test Results:

1. Equipment performance test shall demonstrate to Engineer that the switchgear and its component operate as designed and as specified.

2. Production testing procedures and the recording of the test results shall comply with the standard production tests published by IEEE C37.20.3.

B. Production Tests:

1. Production tests for switchgear assemblies shall be power frequency dielectric tests, mechanical tests, grounding of instrument transformer case tests, and electrical operation and control wiring check. Furnish to Engineer a certified report of the test signed by a State of California registered Engineer responsible for the test. Record simultaneous load currents. Production testing shall be reviewed by Engineer.

C. Dielectric Tests:

1. Power frequency withstand tests shall be made at the factory on each switchgear assembly structure. Tests shall be made phase to phase and each phase to ground. For production tests, the removable elements need not be tested in the assembly if they are tested separately. Perform contact resistance test across each switch blade, and report any contact resistance in excess of 50 micro-ohms.

2. Grounding:

a. Measure and record the resistance of earth ground at 38 kV.

3. Coordination Curves:

a. Provide the coordination curves for selective tripping of overcurrent devices. Redraw the curves where required due to substitution of relays or fuses other than those used in engineering design. Exact fusing and relay setting descriptions shall be installed at each overcurrent device in a permanent manner.

b. Mechanical Operation Tests:

1) Perform mechanic.al tests to ensure the functioning of switches, removable unit operating mechanisms and mechanical interlocks. These tests shall ensure the interchangeability of removable units designed to be interchangeable.

c. Control Wiring Continuity:

1) The control wiring of the switchgear assembly shall be verified by the electrical operations of the component control devices.

d. Ground Fault System Test:

1) Conduct ground fault system test if required, in conformance with instructions provided with the equipment. A written record of this test shall be made and shall be available to Engineer and City of Los Angeles Department of Building and Safety.

2.6 UNDERWRITERS LABORATORY (UL) FIELD EVALUATION AND CERTIFICATION

A. MV metal enclosed switchgear, including but not limited to its components, housing, assembly and operation, shall be field evaluated and certified by UL field inspection services and shall be UL labeled.

B. Manufacturer shall coordinate and obtain UL field evaluation and certification at the factory, prior to shipment.

C. Manufacturer shall arrange necessary factory visit(s) of UL evaluation staff, pay for costs, including but not limited to UL field evaluation and certification fees, UL staff factory visit travel expenses, transportation (air and ground), lodging, and per diem costs. During the first visit UL staff shall review the switchgear and, in the event of required correction, shall submit a written correction list to the manufacturer.

D. Manufacturer shall comply with UL field evaluation correction items and shall correct the conditions in compliance with UL field evaluation requirements at no additional cost. In the event of the correction compliance requiring a follow-up UL staff factory visit, the manufacturer shall pay for costs, including but not limited to fees, travel expenses, transportation (air and ground), lodging and per diem costs for the UL field staff.

E. Upon completion of the corrections, and as required by UL, manufacturer shall comply with the following:

1. Manufacturer shall obtain final UL factory field evaluation and approval certificate from UL and shall submit the original of this certificate to Engineer within 15 Calendar Days of obtaining certificate.

2. Manufacturer shall include a copy of UL factory field evaluation and approval certificate in the transformer's operation and maintenance manual and shall submit the operation and maintenance manual in conformance with requirements of this Section.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Contractor shall visibly inspect and confirm that items and accessories have been received and are in accordance with Drawings and Specifications. Verify field measurements are as shown on reviewed shop drawings.

B. Contractor shall verify that control power is available, external or internal, for heater circuits in outdoor NEMA 3R equipment. Heaters shall be energized to control temperature and condensation during the time equipment is not energized.

3.2 INSTALLATION

A. Work of assembly· in the field by Contractor shall consist of unloading, setting, aligning, leveling, and fastening the stationary housing to the concrete slab, connecting bus Work, cables at shipping splits, and attaching power and control cables at appropriate terminals.

B. Switchgear shall be installed in conformance with manufacturer's written instructions, applicable requirements of NEC and in conformance with recognized industry practices.

C. Where switchgear is shipped in sections, Contractor shall assemble into a complete switchgear line-up. Primary bus connections shall be installed and torqued in conformance with manufacturer's written instructions.

D. Low voltage control wiring splices shall be completed including communication cable connections for the PMCS system.

E. Verify that primary cable connections for surge arresters have been completed with proper spacing between conductors.

3.3 FIELD QUALITY CONTROL

A. Contractor shall secure, pay for, and deliver manufacturer's field service organization for field inspection and testing of the switchgear.

B. Contractor shall provide detailed start up and testing procedure based on component material as part of the switchgear.

C. Load interrupter switches shall be operated manually to verify proper open and close positions.

D. Perform low frequency Withstand test in conformance with IEEE C37.20.2 paragraph 5.5. Field test voltage shall not exceed 75 percent of factory test value. If equipment has been stored for a long period of time during construction accumulating dust, dirt, moisture, and/or other contaminants, it shall be restored to good condition before field dielectric tests are performed.

E. Contractor shall repair paint chips and scratches with manufacturer supplied paint.

F. Contractors hall engage manufacturer's field service organization to set all relays in conformance with the short circuit current and coordination study.

3.4 SHORT CIRCUIT AND COORDINATION STUDY

A. Switchgear manufacturer shall conduct short circuit and coordination power system study to include coordination with the ship manufacturer's switchgear.

B. Switchgear manufacturer's technician shall set the protective relay devices based on the coordination study report.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. 15 kilovolt (kV) metal-clad switchgear

B. Electrical Power Monitoring (EPM) system shall employ same hardware and software as Department's existing EPM. New EPM network and equipment shall interface and be completely compatible with the existing EPM network and components of the installed EPM base.

C. Refer to Manufacturer Article of this Section for requirements on manufacturers of Electrical Power Monitoring (EPM) and other electrical products.

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 08 02 - Electrical Systems and Products Manufacturer's Certification, Quality Assurance, and Warranty Verification

C. Section 26 09 13 - Electrical Power Monitoring (EPM)

D. Section 26 13 31 - 15 kV Metal-Enclosed Switchgear

E. Section 26 13 37 - 38 kV Metal-Clad Switchgear

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 B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.

B. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

C. IEEE C37.06 - IEEE Standard for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis - Preferred Ratings and Related Required Capabilities for Voltages Above 1000 V.

D. IEEE C37.20.1 - IEEE Standard for Metal-Enclosed Low-Voltage (1000 Vac and Below, 3200 Vdc and Below) Power Circuit Breaker Switchgear.

E. IEEE C37.20.2 - IEEE Standard for Metal-Clad Switchgear.

F. ISO 9000 - Quality Management Systems -- Fundamentals and Vocabulary.

1.5 SUBMITTALS

A. Submit the following to Engineer within 14 Calendar Days of Notice to Proceed (NTP):

1. Submit to Engineer for review prior to fabrication the switchgear shop drawings showing general arrangement, single line diagram, switchgear elevation, switchgear floor plan arrangement, switchgear sectional views, conduit entry and exit locations, main and feeder breakers schematic drawings, control wiring diagrams, assembly and component ratings, and terminal blocks arrangement. These drawings shall provide installation and coordination data required for the preparation of electrical and mechanical details necessary for the installation of the switchgear.

B. Manufacturer’s parts list, operation manual, descriptive bulletins, and maintenance manual.

C. Certification that the equipment meets City of Los Angeles Electrical Code.

D. Test data for the integrated equipment short circuit ratings per sections.

E. Short circuit analysis and coordination study of overcurrent devices for approval along with the switchgear submittals. Submittals shall be approved and stamped by a State of California registered electrical engineer.

F. Reports:

1. Present tests results in an indexed engineering report. 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.

2. The engineering report shall be certified and signed by a State of California registered electrical engineer that the equipment has been installed, adjusted, and tested in conformance with manufacturer’s written instructions.

1.6 SEISMIC REQUIREMENTS

A. Switchgear shall be Seismically Qualified to comply with City of Los Angeles Building Code latest requirements. Provide Seismically Qualified Certificates for each switchgear lineup.

1.7 QUALITY ASSURANCE

A. Manufacturer shall be ISO 9000, ISO 9001, and ISO 14001 certified to demonstrate quality compliance and responsible environmental management.

B. Switchgear assembly manufacturer shall be the same manufacturer of the major components including the circuit breaker within the assembly.

C. The manufacturer of the equipment shall have produced similar electrical equipment for a minimum period of 5 years. When requested by Engineer, provide an acceptable list of installations with similar equipment demonstrating compliance with this requirement.

D. Equipment shall be installed in conformance with manufacturer's written instructions and contract drawings.

E. Provide the services of a qualified, factory-trained manufacturer's factory engineer to assist in the installation and start-up of the equipment specified in this Section. Manufacturer's factory engineer shall provide technical direction and assistance in general assembly of the equipment, connections and adjustments, and warranty verification and certification of the assembly and components.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Handle and store equipment in conformance with manufacturer’s written instructions. A copy of these instructions shall be included with the equipment at time of shipment.

B. Shipping groups shall be designed to be shipped by truck, rail, or ship. Bolt indoor groups to skids. Package and ship accessories separately.

C. Switchgear shall be equipped to be handled by crane. Where cranes are not available, switchgear shall be suitable for skidding in place on rollers using jacks to raise, and lower the groups.

D. Switchgear being stored prior to installation shall be stored so as to maintain the equipment in a clean and dry condition. If stored outdoors, indoor gear shall be covered and heated, and outdoor gear shall be heated in conformance with manufacturer's written instructions.

1.9 WARRANTY

A. Warrant switchgear free parts and service for one year from the date of energization or 18 months from date of shipment by manufacturer whichever comes first.

1.10 SEISMIC REQUIREMENTS

A. Switchgear shall be Seismically Qualified to comply with City of Los Angeles Building Code latest requirements. Provide Seismically Qualified Certificates for each switchgear lineup.

1.11 ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION

A. For electrical systems and products manufacturer's field engineering services, standard compliance certification, quality assurance, warranty verification, training, and prefabrication document review meeting and inspection verification meeting requirements, refer to ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION Section for requirements.

1.12 OPERATION AND MAINTENANCE MANUAL

A. Contractor shall furnish 2 hard copies, 5 AutoCAD, and 1 electronic file format of the installation, operating, and maintenance instructions to Engineer. 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.

B. Verify that primary cable connections for surge arresters have been completed with proper spacing between conductors.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. The metal clad switchgear shall be Masterclad as manufactured by Square D by Schneider Electric.

B. The manufacturer of 15 kV metal clad switchgear shall be the same manufacturer as 5 kV metal-clad switchgear, 15 kV metal enclosed switchgear, 18 MVA transformer, and electrical power monitoring system.

2.2 EQUIPMENT REQUIREMENTS

A. The outdoor, non-walk in, metal-clad switchgear shall be rated in conformance with the following:

1. Rated voltage: 15 kV, 3-phase, 3-wire, Frequency: 60 Hz 1 minute withstand voltage: 36 kV RMS, Max short circuit current: 40 kA RMS symmetrical, Impulse withstands voltage (BIL): 95 kV, Bus Bracing: 50 kA RMS symmetrical Main Bus Ampacity: 2000 Amperes

B. Construction: Each equipment bay shall be a separately constructed cubicle assembled to form a rigid freestanding unit. Minimum sheet metal thickness shall be 11-gauge steel on exterior surfaces. Adjacent bays shall be securely bolted together to form an integrated rigid structure. The rear doors shall be hinged with 3-point latch/lock to assist installation and maintenance of bus and cables. Each individual unit shall be braced to prevent distortion.

C. Dimensions: Standard dimensions per outdoor section are: 36 inches wide by 109 inches high by 99 inches deep. Maximum height shall be 109 in for non-walk-in, National Electrical Manufacturers Association (NEMA) 3R style enclosure, measured to peak of the sloped roof.

D. Steel parts, except galvanized (if used), shall be cleaned and a zinc-phosphate (outdoor equipment) pre-treatment applied prior to paint application. The finish shall consist of a coat of gray (American National Standards Institute (ANSI) 61), TGIC polyester powder paint applied electrostatically to pre-cleaned and phosphatized internal and external parts. Following paint application, parts shall be baked to produce a hard durable finish. The coating shall withstand salt spray test for corrosion resistance of 2,500 hours for outdoor equipment in conformance with ASTM D1654 and ASTM B117. The average thickness of the paint film shall be 2.0 mils. Paint film shall be uniform in color and free from blisters, sags, flaking, and peeling.

E. Switchgear assembly, including circuit breakers, meters, and relays shall be factory-tested and circuit breakers of like rating shall be interchangeable.

F. Switchgear shall consist of circuit breakers as shown on Drawings, assembled to form a rigid, self-supporting, complete, metal-enclosed structure providing 2 thicknesses of painted steel between units. Each breaker unit structure shall be separated by metal barriers into the following compartments: circuit breaker, main bus, instrument auxiliary device, and cable.

G. Circuit Breaker Compartment:

1. Each circuit breaker compartment shall be designed to house a horizontal draw out metal clad vacuum circuit breaker. The stationary primary disconnecting contacts shall be silver-plated copper and mounted within porcelain support bushings. The movable contacts and springs shall be mounted on the circuit breaker element for ease of inspection and maintenance.

2. Entrance to the stationary primary disconnecting contacts shall be automatically covered by metal shutters when the circuit breaker is withdrawn from the connected position to the “test” or “disconnected” position or removed from the circuit breaker compartment. Provide means for padlocking the shutters in the “closed” position for safety purposes when the breaker element is removed from the compartment for long periods of time. A ground bus shall extend into the circuit breaker compartment to automatically ground the breaker frame with high-current spring-type grounding contacts located on the breaker chassis when in the “test” and “connected” positions. Welded guide rails for positioning the circuit breaker and other necessary hardware shall be an integral part of the circuit breaker compartment. Blocking devices shall interlock breaker frame sizes to prevent installation of a lower ampere rating or interrupting capacity element into a compartment designed for one of a higher rating. It shall be possible with indoor or outdoor walk-in switchgear to install a circuit breaker into a bottom compartment without use of a transport truck or lift device.

H. Cable Compartment:

1. Normal main breaker cable entry compartment shall contain insulated bus connecting to utility metering section as shown on Drawings. Extend connection of bus into breaker compartment by means of porcelain bushings. The current transformers for overcurrent protection and other relaying functions shall be mounted on porcelain bushings accessible only through main breaker compartment behind the automatic shutter assembly. The ground bus shall extend through this compartment for the full length of the switchgear.

I. Main Bus Compartment:

1. The main bus shall be rated 1200 amps as shown on single line drawing and be fully insulated for its entire length with an epoxy coating by the fluidized bed process. The conductors are to be silver-plated copper and be of a bolted (not welded) design. Access to this compartment is gained from the front or rear of the structure by removing a steel barrier. Provide standard provisions for future extension, as applicable. Provide insulating boots at bus splices, and at incoming and outgoing cable terminations.

J. Doors and Panels:

1. Mount relays, meters, instruments, control, and switches on a formed, front-hinged panel. The breaker compartment shall have a formed hinged panel separated from that for the relays and meters. In the event the quantity of relays and meters becomes excessive, provide a full front, hinged panel to allow for mounting the additional devices.

2. The outdoor switchgear shall be provided with full height rear doors

K. Provide “Kirk Lock” Type F to the circuit breaker cubicle as necessary for the operation of the system and safety of the operator. The key lock system and operation shall be designed in conjunctions with other associated equipment. Provide 2 sets of kirk keys, keyed alike, for Department use.

L. Circuit Breaker:

1. The circuit breakers shall be rated 15,000 volts, 60 Hz, with a continuous current rating of 200 amps as shown on single line drawings and a maximum symmetrical interrupting rating based on Table 1 of IEEE C37.06 of 40 kA - 15 kV system. Maximum symmetrical kA interrupting ratings are based on Table 1 of C37.06. MVA ratings are nominal reference values for comparison only. Furnish Type VR circuit breakers with one vacuum interrupter per phase. Hermetically seal the vacuum interrupters in a high vacuum, protecting butt contacts from moisture and contaminated atmosphere. Provisions shall be made for slow closing of the contacts. Circuit breaker shall have a wear indicator available to the user. Circuit breaker interrupting time shall not exceed 3 cycles. The interrupters shall be maintenance free. Breakers of same type and rating shall be completely interchangeable. Breaker control voltage shall be 120 V AC. Trip voltage shall be dual capacitor 170V DC.

2. The circuit breaker shall be operated by means of a stored energy mechanism which is normally charged by a universal motor but can also be charged by the manual handle supplied on each VR breaker for manual emergency closing or testing. The closing speed of the moving contacts is to be independent of both the control voltage and the operator.

3. Provide a full front shield on the breaker. Secondary control circuits shall be connected automatically with a self-aligning, self-engaging plug and receptacle arrangement when the circuit breaker is racked into the connected position. Provision shall be made for secondary control plug to be manually connected in test position. A minimum of 4 auxiliary contacts (2a 2b), shall be provided for external use. Provisions shall be made for 6 additional cell-mounted auxiliary contacts both mechanism-operated cell (MOC) and truck-operated cell (TOC) type for external use. The racking mechanism to move the breaker between positions shall be operable with the front door closed and position indication shall be visible with door closed. Provide 24 VDC 30 VA, power supply and wire 1 set of MOC 1a, 1b auxiliary contacts to ION900T (or PLC) inputs for breaker contact status (open or closed). Wire 1 set of TOC 1a, 1b auxiliary contacts to ION900T (or PLC) inputs for breaker position status (racked in, test / disconnect, or racked out). Wire 1 set of interposing relay 1a, 1b auxiliary contacts from 86 device to ION900T (or PLC) inputs for breaker 86 device lockout status (breaker tripped). Wire 1 set of interposing relay 2a, 2b auxiliary contacts to ION900T and to MOC 2a, 2b contacts from 86 device for 120 V crane E-Stop circuit. Existing crane E-Stop circuit shall be wired to input contacts on 86 device and interposing relay.

4. An interlocking system shall be provided to prevent racking a closed circuit breaker to or from any position. An additional interlock shall automatically discharge the stored-energy operating mechanism springs upon removal of the breaker out of the compartment. For breaker status, directly connect breaker auxiliary contact to ION900T (or PLC) inputs.

5. Circuit breaker control voltage shall be 120 volts AC with back-up UPS power supply. Provide dual capacitor trip units for each circuit breaker.

6. Provide a full-front shield on the breaker element in order to bar operating personnel from the live primary bus when the breaker is installed in the circuit breaker compartment.

7. Provide red and green LED pilot lights to indicate breaker close and open position.

M. Instrument Transformers:

1. Current transformers: Each breaker compartment shall have provision for front-accessible mounting of up to four current transformers per phase (high accuracy and/or ratios below 150:5, two per phase; ANSI standard relay accuracy), two on bus side and two on cable side of circuit breaker. The current transformer assembly shall be insulated for the full voltage rating of the switchgear. The current transformers wiring shall be Type SIS #12 AWG. Relaying and metering accuracy shall conform to ANSI Standards.

2. Voltage transformers are drawout mounted with primary current-limiting fuses and shall have ratio as indicated. The transformers shall have mechanical rating equal to the momentary rating of the circuit breakers and shall have metering accuracy in conformance with ANSI Standards.

N. Control Wiring:

1. Switchgear shall be wired with Type SIS 14 AWG, copper conductors rated 600 V, 90 degrees C except where larger is specified. Provide switchgear with terminal blocks for outgoing control connections. Wire markers shall be provided for each end of control wires.

O. Protective Relays: Provide only PowerLogic P5 multifunction digital relays (no known equal) as indicated on Drawings for each circuit breaker.

P. Space Heaters:

1. Provide each separate compartment of outdoor switchgear with a properly sized strip heater with control thermostat. Prior to energization, space heaters shall be powered, so the on-site switchgear stored in Ports marine environment is completely dry, no moisture available.

Q. Electric Outlets and Lights:

1. Provide each separate compartment of switchgear with fluorescent lights with switch and one GF electrical receptacle.

R. Uninteruptible Power Supply (UPS):

1. Provide 1 UPS per metal-clad lineup when AC control power is required. UPS shall be Falcon model SSG3KRP-1-CB 3000 VA, 120 VAC output, double conversion rack and tower mounted on shelf with 6-foot cord for connecting batter to UPS with hot-swap battery modules, and with out card wired to ION900T (or PLC) inputs for UPS alarms. AC control voltage shall be derived from a control power transformer mounted in the switchgear.

S. Ethernet Communications Hardware:

1. 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.

T. Ethernet Communications Cables:

1. CAT6 communications cables (quantities and lengths as requried) with RJ-45 terminations on each end, from Micrologic 6.0P Breaker Trip Units, Enerlin'X IFE Interface Units, and PowerLogic meters to the N-Tron Ethernet Switch. Provide 12-strand, 8.25 micron, single-mode, 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.

2.3 LIFT TRACK AND REMOTE RACKING DEVICE

A. Provide 1 metal-clad breaker lift truck from switchgear manufacturer. Provide 1 CBS ArcSafe wireless remote racking device with 25-foot cord-connected pistol-grip switch for 15 kV Metal-Clad VR Series circuit breaker.

2.4 ARC FLASH MITIGATION SYSTEM

A. Provide VAMP 321 Arc Flash Mitigation System per switchgear lineup, as shown on Drawings. Mount VAMP 321 relay in low-voltage instrument compartment of either human machine interfaces (MI) Section of Spare Breaker Section. Provide VAMP 321 system with light and current input cards, fiber optic Ethernet Comms card, #3LX Fiber Optic Loop Modules, 12LD Light Modules, and Point Light Sensors. Provide #VYX-001 Z-shaped and #VYX-002 L-shaped wall mounting brackets for #VA1DA-10 point light sensors, connected to #LD Light Modules. Provide #ARC-SL-10 Arc Fiber Cables (numbers and lengths as shown on Drawings), in live bus compartments to #3LX Fiber Optic Loop Modules. Provide #VX001-10 Arc Modular Cables with RJ-45 connectors (numbers and lengths as shown on Drawings), between I/O modules, and to VAMP 321 relay. Provide VAMP Software Version V2.2.191 on EPM server and CAT6 comms cable with RJ-45 connectors from VAMP 321 relay to N-Tron Ethernet Switch in the same lineup.

2.5 DETAILS OF MAIN SWITCHGEAR

A. Switchgear assembly shall be complete with structure and copper interconnecting bus and consisting of:

1. Metering and pull sections shall be in conformance with Electric Service Requirements (ESR) of City of Los Angeles Department of Water and Power.

2. Padlockable doors with door stops to hold them open.

3. 3-phase fused control power transformer shall be draw-out type with front-mounted draw-out fuse compartment. Provide Kirk key interlock with secondary main circuit breaker. Provide control power transformer (CPT) with primary voltage as shown on the single line drawing.

4. Secondary main breaker mounted on draw-out mechanism and interlocked to prevent drawing out control power transformer with secondary breaker closed or racking in control power transformer unless secondary breaker is open.

5. Two sets of 3 fused potential transformers (one set installed at line side, and the other installed on the load side) mounted on drawout assembly. The potential transformer drawer shall be designed to disconnect and ground transformer fuses before giving access to potential transformer.

6. Main compartment circuit breaker cubicle shall contain one removable element vacuum circuit breaker in the upper front section; upper half shall house an isolated bus section with control power transformer and voltage transformers. Control/instrument panel shall house PowerLogic P5 digital relay, and PowerLogic monitor ION900T as shown on the single line drawing. These shall be installed in the front section of the compartment. The compartment shall have provisions for padlocking, and with stops to hold in the open position. No known equal for PowerLogic P5 digital relays and PowerLogic monitor type ION900T.

2.6 FACTORY TESTING

A. Testing Procedures and Test Results:

1. Equipment performance test shall demonstrate to Engineer that the switchgear and its components operate as designed and as specified.

2. Production testing procedures and the recording of the test results shall comply with the standard production tests published by IEEE C37.20.1.

3. Conduct a ground fault protection system test in conformance with manufacturer's written instructions provided with the equipment. A written record of this test shall be made and shall be available to Engineer and City of Los Angeles Department of Building and Safety.

B. Production Tests:

1. Production tests for switchgear assemblies shall be power frequency dielectric tests, mechanical tests, grounding of instrument transformer case tests, and electrical operation and control wiring check. Furnish to Engineer a certified report of the test signed by a State of California registered electrical engineer responsible for the test. Measure and record the voltages of transformer secondaries. Record simultaneous load currents. Production testing shall be reviewed by Engineer.

a. Dielectric Tests:

1) Power frequency withstand tests shall be made at the factory on each switchgear assembly structure. Tests shall be made phase to phase and each phase to ground. For production tests, the removable elements need not be tested in the assembly if they are tested separately.

2. PowerLogic P5 Relays:

    a. Calibrate and set the relays, for proper operation. The relays shall be set by qualified manufacturer's representative with settings in conformance with the coordination study.

    b. 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.

3. Grounding:

    a. Measure and record the resistance of earth ground at 15 kV.

4. Coordination Curves:

    a. Provide the coordination curves for selective tripping of overcurrent devices. Redraw the curves where required due to substitution of relays or fuses other than those used in the engineering design. Exact fusing and relay setting descriptions shall be installed at each overcurrent device in a permanent manner.

5. Mechanical Operation Tests:

    a. Perform mechanical tests to ensure the functioning of switches, removable unit operating mechanisms and mechanical interlocks. These tests shall ensure the interchangeability of removable units designed to be interchangeable.

6. Control Wiring Continuity:

    a. The control wiring of the switchgear assembly shall be verified by the electrical operations of the component control devices.

7. Polarity Tests:

    a. Perform tests to ensure that connections between instrument transformers, meters, or relays are correctly connected for polarities. Check instruments for correct direction.

8. Sequence Tests:

    a. Test switchgear assemblies involving sequential operation of devices to ensure that the devices are in the sequence function in order intended.

9. Ground Fault System Test:

    a. Conduct ground fault system test in conformance with instructions provided with the equipment. A written record of this test shall be made and shall be available to Engineer and City of Los Angeles Department of Building and Safety.

2.7 SHORT CIRCUIT, COORDINATION, AND ARC FLASH STUDY

A. Switchgear manufacturer shall conduct and submit short circuit, coordination power system, and arc flash studies to include coordination with the load as indicated on Drawings and shall furnish arc flash labels.

B. The studies shall account for fault current contributions from the vessel at Berth 49, where applicable, and ensure coordination between ship and shore protection systems.

C. Switchgear manufacturer’s technician shall set the protective relay devices based on the coordination study report.

2.8 UNDERWRITERS LABORATORY FIELD EVALUATION AND CERTIFICATION

A. 15 kV metal clad switchgear, including but not limited to its components, housing, assembly, and operation, shall be field evaluated and certified by Underwriters Laboratories, Incorporated (UL) field inspection services and shall be UL labeled.

B. Manufacturer shall coordinate and obtain UL field evaluation and certification at the factory, prior to shipment.

C. Manufacturer shall arrange necessary factory visit(s) of UL evaluation staff, pay for costs, including but not limited to UL field evaluation and certification fees, UL staff factory visit travel expenses, transportation (air and ground), lodging, and per diem costs. During the first visit UL staff shall review the switchgear and, in the event of required correction, shall submit a written correction list to the manufacturer.

D. Manufacturer shall comply with UL field evaluation correction items and shall correct the conditions in compliance with UL field evaluation requirements at no additional cost. In the event of the correction compliance requiring a follow-up UL staff factory visit, the manufacturer shall pay for costs, including but not limited to fees, travel expenses, transportation (air and ground), lodging, and per diem costs for UL field staff.

E. Upon completion of the corrections, and as required by UL, manufacturer shall comply with the following:

1. Manufacturer shall obtain final UL factory field evaluation and approval certificate from UL and shall submit the original of this certificate to Engineer within 15 Calendar Days of obtaining certificate.

2. Manufacturer shall include a copy of UL factory field evaluation and approval certificate in the transformer's operation and maintenance manual and shall submit the operation and maintenance manual in conformance with requirements of this Specification.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Visibly inspect and confirm that items and accessories have been received and are in conformance with Specifications and Drawings. Verify field measurements are as shown on approved shop drawings.

B. Verify that control power is available, external or internal, for heater circuits in outdoor NEMA 3R equipment. Heaters shall be energized to control temperature and condensation during the time equipment is not energized.

3.2 INSTALLATION

A. Work of assembly in the field by the electrical contractor shall consist of unloading, setting, aligning, leveling, and fastening the stationary housing to the concrete slab, connecting bus Work, cables at shipping splits, and attaching power and control cables at appropriate terminals.

B. Switchgear shall be installed in conformance with manufacturer's written instructions, applicable requirements of NFPA 70, and in conformance with recognized industry practices.

C. Where switchgear is shipped in sections, Contractor shall assemble into a complete switchgear line-up. Primary bus connections shall be installed and torqued in conformance with manufacturer's written instructions. Install bus splice insulating boots.

D. Field-installed interconnect wiring, such as low voltage, controls, CT, communications, EPM system, and ION900T (or PLC) I/O wiring shall be continuous. Splices in field-installed interconnect wiring are not allowed.

E. Verify that primary cable connections for surge arresters have been completed with proper spacing between conductors.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Secure, pay for, and deliver manufacturer’s field service organization for field inspection and testing of the switchgear.

2. Provide detailed start-up and testing procedure based on component material as part of the switchgear.

3. Circuit breakers shall be operated mechanically and electrically in drawout positions. Breakers shall be racked into connected position and out of cell to test and disconnect positions. Verify TOC and MOC contact operations. Verify operation of any key interlocks that may be part of switchgear.

4. Perform low frequency withstand test in conformance with IEEE C37.20.2 paragraph 5.5. Field test voltage shall not exceed 75 percent of factory test value of 36 kV AC. If equipment has been stored for a long period of time during construction accumulating dust, dirt, moisture, and/or other contaminants, it shall be restored to good condition before field dielectric tests are performed.

5. Repair paint chips and scratches with manufacturer supplied paint.

6. Secure, pay for, and deliver manufacturer’s factory engineer to set relays in conformance with the short circuit current and coordination study.

3.4 GROUND FAULT PROTECTION SYSTEM

A. Conduct test in conformance with manufacturer's written instruction provided with the equipment. A written record of this test shall be made available to Engineer and City of Los Angeles Department of Building and Safety.

3.5 TRAINING

A. Upon acceptance of Work, provide a training session for up to 3 Department Construction and Maintenance shifts (day, evening, and night) at Project Site.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. 38 kilovolt (kV) metal-clad switchgear

B. Arrangement shall comply with Drawings for functional operation with main breaker and feeder breakers.

C. Equipment supplied shall be connected to existing Port of Los Angeles (POLA) Web enabled internet access system for Electrical Power Monitoring (EPM) System.

D. EPM system shall employ same hardware and software as Department's existing EPM. New EPM network and equipment shall interface and be completely compatible with the existing EPM network and components of the installed EPM base.

1.2 RELATED SECTIONS

A. Section 26 00 01 - Basic Electrical Materials and Methods

B. Section 26 08 02 - Electrical Systems and Products Manufacturer's Certification, Quality Assurance, and Warranty Verification

C. Section 26 09 13 - Electrical Power Monitoring (EPM)

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 C12.20 - American National Standard for Electricity Meters - 0.1, 0.2, and 0.5 Accuracy Classes.

B. IEEE C37.20.2 - IEEE Standard for Metal-Clad Switchgear.

1.5 SUBMITTALS

A. Prior to equipment fabrication contractor shall submit the following drawings to Department subject to Engineer's review and approval. Contractor shall not release the equipment drawings to manufacturer for fabrication prior to obtaining Department's approval. 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.

1. Submit the following to Engineer within 14 Calendar Days of Notice to Proceed (NTP):

   a. Complete dimensioned assembly drawing(s) showing plan, elevation, section views, and weights.

   b. Plan showing exact location and details of channel sill, anchor bolts, and terminations of power bus and control cables.

   c. Elementary or schematic diagrams.

   d. Section views and detailed dimensioned drawings of the end for future additions, if required.

   e. Bill of material shall be provided listing the devices and accessories to be furnished. The bill of material shall include complete identification and description of the devices.

   f. Equipment shall be shown on the cubicle Wiring Diagram with the same relative position as shown on Front View Drawing. On Wiring Diagram, the rear view shall be shown for equipment mounted on the front of the panel where space is available on the front of the panel. Shipping splits shall be shown on drawings of cubicles affected, showing clearly connections to be made when installing the switchgear.

   g. Terminal block drawings shall provide space to show purchaser’s connections.

2. Revisions to Drawings shall be identified.

3. Seller shall furnish drawings for record via AutoCAD drafting system in hard copy and electronic file format.

4. One complete set of Operation and Maintenance Manuals for each piece of equipment specified shall be furnished at time of shipment with the equipment and the balance of Operation and Maintenance Manuals 2 weeks after equipment has shipped. One set of “as built” drawings shall be sent within 2 weeks after equipment has been final commissioned.

5. Equipment, apparatus, and material furnished shall be subject to American National Standards Institute (ANSI) factory production tests and inspection by Engineer's representative (see witness test article).

B. Submit a complete report of detailed start up and testing procedure based on component material as part of the switchgear to Engineer subject to Engineer's review and approval. Any discrepancies shall be corrected by switchgear manufacturer.

1.6 QUALITY ASSURANCE

A. Manufacturer’s Master Quality Control Manual shall be available for review at manufacturer’s facility during any visit by Engineer. Manufacturer shall be specialized in medium-voltage metal-clad switchgear with at least 5 years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Manufacturer shall prepare equipment for shipping and protect switchgear against damage in transit.

B. The metal-clad switchgear shall be fully assembled and tested at the factory prior to shipment. Large line-ups shall be split to permit shipping and handling for ease of reassembly at Project Site.

C. Switchgear shall be provided with adequate lifting means for moving and handling at Project Site. Provisions for anchoring shall be provided for use by purchaser on a level foundation.

D. Shipping: Manufacturer shall load and protect equipment to prevent damage in transit. Where apparatus or equipment isn’t bolted to the structure, it shall be packed in separate boxes. Manufacturer shall provide shipping details to Engineer and Contractor.

E. Contractor shall receive and offload switchgear from truck providing crane and spreader bars as required, using only the lifting provisions as directed by the manufacturer and handling instructions. Contractor shall inspect switchgear both externally and internally for evidence of shipping and handling damage.

F. Contractor shall protect equipment from weather and moisture by covering with heavy plastic and by maintaining heat within enclosure in conformance with manufacturer's written instructions.

1.8 EXTRA MATERIALS AND ACCESSORIES

A. Provide 1 complete set of manufacturer's standard accessories for test, inspection, maintenance and operation of circuit breakers and metal-clad switchgear.

B. As a minimum, accessories shall include the following:

1. 1-control jumper for checking breakers outside the stationary structure
2. 1-racking crank for breaker levering in mechanism
3. 1-set of rail clamps
4. 1-set of extension rails as required
5. 1-special wrench or tool(s) that are needed for routine maintenance
6. 1-breaker lift truck for use with National Electrical Manufacturers Association (NEMA) 3R walk-in enclosure
7. 1-CBS ArcSafe wireless remote racking device with 25-foot cord-connected piston-grip switch for 34.5 kV metal-clad circuit breaker.

C. Provide 1 complete set of spare control fuses for each set installed. Spare fuses shall include primary fuses supplied for control power Transformer(s) and voltage transformers.

1.9 ELECTRICAL SYSTEMS AND PRODUCT MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION

A. For electrical systems and product manufacturer's field engineering services, standards compliance certification, quality assurance, warranty verification, training, and prefabrication document review meeting and inspection verification meeting requirements, refer to ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION Section.

1.10 CERTIFIED TEST REPORTS

A. Manufacturer shall provide certified test reports of design tests as applicable in conformance with IEEE C37.20.2 Section 5.2 and 5.21 through 5.29. Copies of certified test reports shall be submitted for approval by Engineer 7 Calendar Days after Notice to Proceed.

1.11 OPERATION AND MAINTENANCE MANUAL

A. Furnish 2 hard copies, 5 AutoCAD, and 1 electronic file in PDF format on external flash drive of the installation, operating, and maintenance instructions to Engineer. 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 METAL CLAD SWITCHGEAR ASSEMBLY

A. The metal-clad switchgear shall consist of outdoor NEMA 3R walk-in enclosure containing circuit breakers draw-out mounted, control power transformer(s) as indicated on 1 line drawing, draw-out mounted voltage transformers line, and/or bus connected as indicated on 1 line drawing and necessary accessory components. Equipment shall be factory assembled except for necessary shipping splits and operationally checked at the factory. The assembly shall be self-supporting for mounting on a concrete pad. The integrated switchgear assembly shall withstand the effects of closing, carrying and interrupting currents up to the assigned short circuit current rating. Switchgear shall be suitable for connection to City of Los Angeles Department of Water and Power 34.5 kV service and meet their requirements for service termination rated 200 kV BIL. Incoming line and termination spacing/clearance shall be approved by City of Los Angeles Department of Water and Power (LADWP).

B. System voltage is 34.5 kV nominal, 3 phase solidly grounded, 60 Hz.

C. Rated voltage: 38 kV.

D. Impulse withstand (Basic Impulse Level): 150 kV.

E. Power frequency withstand 80 kV, 1 minute test.

F. Main bus ampacity: 1200 amperes continuous.

G. Momentary current rating equal to circuit breaker close and latch rating.

H. Temperature limits shall comply with ANSI standards. The normal current carrying capacity rating of the circuit breakers and other equipment covered under this specification shall be based upon their temperature rise, including connections, as enclosed, when carrying full rated current continuously. The temperature rise of current carrying parts and apparatus shall not exceed 65 degrees Celsius (C) over a maximum ambient temperature of 40 degrees C inside the enclosure. The temperature of non-current carrying parts of the structure shall not exceed 70 degrees.

2.2 COMPONENTS

A. Stationary Structure:

1. Switchgear shall consist of the required number of vertical sections including breaker compartments and auxiliary compartments assembled to form a rigid self-supporting completely enclosed structure providing 2 thicknesses of 11 gauge sheet metal between sections.

2. Sections shall be divided by metal barriers into the following separate compartments: circuit breaker, instrument, main bus, auxiliary devices and cable termination area. Each section shall contain only 1 circuit breaker. Rear doors shall be furnished with 3 point vault handle latch assembly having padlock provisions for a minimum 5/16 inch diameter lock shank.

B. Outdoor equipment shall be enclosed in a NEMA 3R non- walk-in weatherproof, gasketed steel housing. Provide heating, ventilation, and air conditioning (HVAC) unit with 95 percent high efficiency particulate air (HEPA) filtration and separately wired remote thermostat. HVAC unit shall have a British Thermal Unit (BTU) per hour rating of 150 percent of BTU per hour rating of the equipment inside the walk-in structure. Front and rear access doors shall have door stops to hold door open at a minimum of 105 degrees. Doors shall have 3 point vault handle latch assembly having padlock provisions for a minimum 5/16” diameter lock shank. Interior lighting with perforated protective metal cover, control switch and GFCI receptacle shall be provided in each vertical section. A 120/240 volt source within the switchgear assembly shall supply space heaters. Provide an adjustable thermostat for control of heaters.

C. Bus shall be silver plated copper and be fully insulated for its entire length with an epoxy coating by the fluidized bed process. Taps and splices shall be furnished with insulating boots to provide access to bolted connections. Provide insulating boots for outgoing cable connections. Bus joints and connections shall be made with grade 5 plated steel hardware with Belleville washers. Manufacturer shall provide torquing instructions for bolt-Belleville washer-nut assembly. Bus supports shall be cast epoxy. Access to main bus shall be provided by removable grounded steel covers from either front or rear. Where applicable, standard provisions for future extension shall be provided.

D. Circuit Breaker Compartment:

1. Each circuit breaker compartment shall be designed to house a horizontal drawout metal-clad vacuum circuit breaker. The stationary primary disconnecting contacts shall be silver plated copper and mounted within glass polyester support bushings. The movable contacts and springs shall be mounted on the circuit breaker element for ease of inspection/maintenance. Circuit breaker requiring manual engagement of secondary contacts or that require the use of umbilical cords or manual plug and socket connection of secondary disconnects are not permitted.

2. Entrance to the stationary primary disconnecting contacts shall be automatically covered by grounded metal shutters when the circuit breaker is withdrawn from the connected position to the test or disconnect position or removed from the breaker compartment. Guide rails for positioning the circuit breaker and other necessary hardware are to be an integral part of the circuit breaker compartment. Blocking devices shall interlock breaker frame sizes to prevent installation of a lower rating or interrupting capacity into a compartment designed for one of a higher rating.

3. Nameplates: Each cubicle shall be provided with engraved laminated plastic nameplates, white with black lettering and with identification and size as specified and indicated on Drawings. Each section front and rear shall have Danger-High Voltage sign.

E. Cable Compartment/Ground Bus: Two hole compression type cable lugs shall be furnished for cable sizes as shown on Drawings. The power cable compartment shall be located at the rear of the structure and shall provide adequate facilities for terminating bottom exit cables. A minimum of 30 inches vertical space shall be provided to accommodate cable bending radius and stress cones. Termination connections shall use NEMA 2 or 4 hole drilling pattern. A full length bare copper ground bus shall be provided and installed near the bottom of the line-up. It shall be 1/4 by 2 inches minimum in cross-section. In the feeder breaker units, provision shall be made for attachment of a NEMA 2-hole ground lug. The ground bus shall be securely bonded to the frame of each section and shall have provisions for grounding the entire assembly at each end of the line-up. Extension provisions similar to those of the power buses shall be provided. Ground bus shall be extended into each circuit breaker compartment to automatically ground the breaker frame with high current spring type grounding contacts located on the breaker chassis when in the test and connected positions.

F. Doors and Panels: Relays, meters, control switches and pilot lights shall be mounted on formed front hinged panels separated from each circuit breaker compartment. Circuit breaker access door shall not be used to mount relays, meters, control switches or pilot lights. Each device shall have engraved laminated plastic nameplate identifying device number and function. Relays, meters, control switches, and pilot lights shall be mounted at no more than 72 inches above finished floor, at eye level.

G. Control Wiring: Each cubicle that has high voltage connection shall have grounded metal barriers effectively isolating control wiring. Control wiring shall be minimum No. 14 AWG or larger, 90 degrees C, 600 volt switchboard wire, type SIS, 41 strand, tinned copper and provided with a permanent wire marking system identifying the from-to wire designation. Current transformer wiring shall be minimum No. 12 AWG type SIS wire. Terminal blocks shall be provided for terminating control wiring using either insulated ring tongue or locking spade terminals. Provide 15 percent spare terminals.

H. Draw-out Circuit Breaker Elements:

1. Circuit breakers shall be rated 34.5 kV nominal voltage, 38 kV maximum design voltage, 60 Hz., with a continuous current rating of 1,200 amperes and a maximum symmetrical interrupting rating of 40kA at K=1.0. Breakers of the same type and rating shall be completely interchangeable. Circuit breaker shall be operated by means of a stored energy mechanism normally charged by a universal motor. Provide manual charging handle for emergency closing or testing. Closing speed of movable contacts shall be independent of both control voltage and operator. Provide a full front shield on the breaker. Each circuit breaker position shall be furnished with 5 normally open and 5 normally closed auxiliary contacts (MOC) in addition to the contacts required for normal circuit breaker control and operation. Auxiliary contacts shall be wired to terminal blocks.

2. Secondary control circuits shall be connected automatically with a self-aligning, self-engaging plug and receptacle arrangement when the circuit breaker is racked into the connected position. Provisions shall be made for secondary control plug to be manually connected in the test position.

3. The racking mechanism to move the circuit breaker between positions shall be operable with the front door closed and position indication shall be visible with door closed. Provide 2 normally open and 2 normally closed cell mounted auxiliary contacts truck-operated cell (TOC) wired to terminal blocks for external use. Sturdy interlocks shall be provided to prevent racking breaker into or from connected position with breaker closed. If breaker is closed when attempting to rack breaker into or out of cell, interlocks shall trip the breaker before racking can begin. A positive stop shall be furnished to prevent over-travel of the breaker in the connected position. Interlock shall be provided to automatically discharge operating springs when removing breaker from cell. Breaker shall be trip free mechanically and electrically during racking. Provide 24 V DC 30 VA power supply and wire 1 set of mechanism-operated cell (MOC) 1a, 1b auxiliary contacts to ION900T inputs for breaker position status (racked in, test/disconnect, or racked out). Wire 1 set of interposing relay 1a, 1b auxiliary contacts from 86 device to ION900T inputs for breaker 86 device lockout status (breaker tripped).

4. Circuit breaker control voltage shall be 120 volts AC. Provide two 120 volt AC capacitor trip units for redundant trip function with separate isolated control wiring and circuit protection. Provide 125 VDC batteries, battery charger, battery rack, eye-wash station, DC battery disconnect switches, and AC and DC panelboards.

5. The breaker front panel shall be a grounded steel barrier that effectively isolates the instrument and control compartments. The front panel shall have the following control and indication features: Breaker open-closed indication, closing springs charge-discharged indication, operations counter and manual trip-close pushbuttons. Breaker closing springs shall automatically be electrically re-charged after breaker is closed.

I. Instrument Transformers:

1. Current transformers (CT): Each breaker compartment shall have provisions for front accessible mounted of up to 4 current transformers per phase, 2 on bus side and 2 on cable side of circuit breaker. Current transformer shall be single ratio and meet ANSI standard relay accuracy requirements. Drawings may indicate multi-ratio (MR) current transformer. If required, only 2 per pole can be used. Ratios of multi-ratio current transformers shall be wired to shorting type terminal blocks. Current transformer wiring shall be No. 12 AWG type SIS minimum. Window type current transformers having an insulation rating of 600 volts, and having fully insulated bus centered in the transformer window opening, shall be acceptable when ionization and impulse tests prove a satisfactory arrangement.

2. Voltage Transformers (VT): Each set of voltage transformers and their primary fuses shall be mounted in separate steel compartments. Primary connections to the transformer shall be insulated and enter the compartment through porcelain bushings. Each set of voltage transformers and fuses shall be mounted on the draw-out steel carriage which shall be capable of disconnecting the transformer fuses from their voltage source and removing them from the structure. This drawout mechanism shall be so arranged that full access to the transformers cannot be accomplished until the fuses are disconnected from the structure. When moved to a fully withdrawn position, the transformer fuses and VT windings shall be automatically grounded. The switchgear shall be designed such that the drawout potential transformer truck can be mounted above the main or feeder circuit breakers in the same vertical section. Voltage transformer shall have mechanical rating equal to the momentary rating of the circuit breakers and have metering and relay accuracies in conformance with ANSI standards.

J. Control Power Transformer:

1. Control power transformer (CPT) shall be single phase and ratings are as indicated on the drawings. CPT and primary fuses,rating indicated on the drawings, shall be mounted on a single drawout steel carriage capable of disconnecting transformer and fuses from their voltage source and removing them from the structure. Switchgear shall be designed to allow drawout CPT truck mounted above main or feeder circuit breaker(s) in the same vertical Section. Larger kVA CPTs require transformer to be fixed mounted with drawout fuse assembly mounted above transformer in a full vertical section.

2. Control power transformer and/or fuse drawout assembly shall be key interlocked with secondary main breaker to prevent drawout operation with secondary main circuit breaker closed. Provide secondary main breaker with key interlock.

3. Provide a secondary circuit breaker panelboard with appropriate number of branch circuit breakers for feeding breaker control power, lights, receptacles, heaters for NEMA 3R construction, relays, metering and auxiliary devices requiring control power source.

K. Control and Indicating Lights:

1. Indicating lights shall be of the light emitting diode (LED) type with color caps designed for maximum visibility, low wattage consumption (maximum 2 watts) and long service life. Red indicating lights show breaker closed, green-open, and amber-lockout.

2. Control switches shall be rotary, multi-position, cam operated, multi-stage type with dust cover and silver to silver contacts rated 600 volts and 20 amperes. Breaker control switches and selector switches shall have pistol grip handles. Meter switches shall have knurled knob handles. Lockout switches shall have oval handles.

L. Wiring:

1. Each switchgear line-up shall be completely assembled, wired, and tested at the factory, including buses, connections, terminals, and terminal blocks.

2. Secondary wiring shall be firmly laced and secured and terminated in approved molded-type terminal blocks conveniently located with respect to shipping splits and control conduit terminals.

3. Secondary wiring shall be No. 14 AWG or larger, 90 degrees C, 600 volt switchboard wire, type SIS, 41 strand, tinned copper and provided with a permanent wire marking system identifying the from-to wire designation.

4. Wiring shall be terminated using insulated ring-tongue or locking spade terminals.

M. Los Angeles Department of Water and Power (LADWP) Incoming Line Termination:

1. LADWP metering equipment is located remote from switchgear. Only the incoming section shall comply with their requirements.

2. Incoming line termination pad basic insulation level (BIL) rating shall be 200 kV with 14.5 inch H cycloaliphatic class A30 insulators having 32 inch creep.

3. Termination pads shall have 19 inches bare bus to bare bus phase clearance and 15 inches bare bus to ground clearance.

4. Termination pads shall be front accessible located 32 inches from exterior front door, 80 inches height from edge of pad to standing surface.

5. Busing from termination pads to rear located switchgear bus shall be insulated using fluidized bed epoxy system maintaining the incoming termination bus clearances less the insulation thickness until connection to switchgear horizontal bus. Then manufacturer’s standard 150 kV BIL bus arrangement may be used.

6. Provide grounded metal screen door behind exterior access door.

7. Provide NEMA standard hole pattern on termination bus pad for 1 cable per phase and ground stud with cover 7 inches above top hole in termination pad. Extend ground bus to front of cubicle and provide front accessible ground bail.

8. Provide 2 adjustable height glass polyester cable supports. Cable supports shall be adjustable vertically and front to rear. Bottom conduit entrance and cable supports shall be centered directly below incoming line termination pads.

9. Contractor shall submit the switchgear drawings and documentation to LADWP subject to their review and approval. Contractor shall be responsible to obtain LADWP's approval of the switchgear. The switchgear drawings and specifications with section views and clearance details shall be approved by LADWP before switchgear is released for production and fabrication.

N. Electrical Power Monitoring (EPM):

1. Power Logic Circuit Monitor shall be ION900T advance energy power quality with high speed transient detection, ANSI C12.20, 0.2 percent accuracy.

2. Control power supply for ION900T Meters, PowerLogic P7 relays, N-Tron Ethernet Switch, HMI, and instruments shall be 120Vac wired from switchgear UPS.

3. ION900T shall have 48 digital status inputs, 4 digital outputs, 2 FORM C relay outputs and pulse output. Wiring from 1 relay output to breaker close circuit and 1 relay output to breaker trip circuit shall be provided. Remote closing and opening functions shall be permitted only when breaker is in connected position.

4. Main breaker (and feeder breakers if required) ION900T shall have 8 digital status inputs. Wiring shall be provided for the following status indications:

   a. Breaker “a” contact closed when breaker is closed.

   b. Breaker “b” contact closed when breaker is open.

   c. TOC contact closed when breaker is in connected position.

   d. TOC contact closed when breaker is in test or disconnect position.

   e. Breaker lockout relay in lockout mode.

   f. Sepam relay failure contact indication.

   g. Breaker springs charge status signal.

   h. UPS multi function alarm.

5. Each ION900T shall have 2 10/100BASE-TX Ethernet communications ports wired with CAT6 cables to N-Tron Ethernet switch located in HMI enclosure.

6. Protective relays shall be PowerLogic P7. Relay requires 120 VAC control power input from UPS. Relay communication shall be wired to the N-Tron Ethernet Switch with CAT6 cable. Provide CAT6 cable from PowerLogic P7 COM Port to the Falcon UPS Ethernet COM Port 1.

7. Provide 1 N-Tron No. 714 FX6-ST Ethernet switch with 8 RJ-45 10/100 BASE-TX and 6 fiber optic multi-mode 10/100 BASE-FX ports with ST connectors. Provide 1 Phoenix Contact No. 2866763 240 W power supply, 48 VDC universal line input for HMI. Mount and wire Ethernet switch and power supplies on din rails on backpan inside HMI enclosure. Provide Red Lion NTPS-24-1.3 24 VDC power supply and Corning SPH-01P single panel housing with 12 threaded ST connections for fiber optic cables.

8. Provide CAT6 communications cables (quatities and lengths as required) with RJ-45 terminations on each end from PowerLogic ION900T Meters, Ethernet Gateways, Enerlin'X IFE Interface Units, PowerLogic P7 relays, and UPS 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.

9. Contractor shall be responsible to ensure that EPM system components, included but not limited to relays, lights, switches, fuses, and circuit monitors, power supplies, gateways, routers, wiring, terminal blocks, terminations, voltage transformers, current transformers, power transformers, and other components of 34.5 kV metal-clad switchgear are inspected, tested and passed the manufacturer's inspection and testing procedures at the switchgear manufacturer’s production facility to ensure EPM system is installed and wired correctly before shipment.

10. Voltage transformer (VT) and current transformer (CT) wiring shall be completed to relays and circuit monitors at manufacturer’s plant.

11. Provide 1 Vartech No. VTPC150HB-MM HMI in NEMA 4 gasketed enclosure, mounted in a door-in-door type construction, such that the enclosure is sealed when not viewing HMI screen. Provide 1 Phoenix Contact No. 2866763 240W power supply, 48 VDC universal line input for HMI. Mount and wire Ethernet switch and power supplies on din rails on backpan inside HMI enclosure.

O. Uninterruptible Power Supply (UPS): Provide 1 UPS per metal-clad lineup when AC control power is required. UPS shall be Falcon model SSG3KRP-1-CB 3000 VA, 120 VAC output, double conversion rack and tower mounted on shelf with 6-foot cord for connecting battery to UPS with hot-swap battery modules, and with output card wired to ION900T (orPLC) inputs for UPS alarms. AC control voltage shall be derived from a control power transformer mounted in the switchgear. UPS shall report the following alarms, Charging Alarm, System Under-voltage Alarm, and Battery System General Alarm.

P. Arc Flash Mitigation System

1. Provide VAMP 321 Arc Flash Mitigation System per switchgear lineup, as shown on Drawings. Mount VAMP 321 relay in low-voltage instrument compartment of either human machine interfaces (HMI) Section or Spare Breaker Section. Provide VAMP 321 system with light and current input cards, fiber optic Ethernet Comms card, #3LX Fiber Optic Loop Modules, 12LD Light Modules, and Point Light Sensors. Provide #VYX-001 Z-shaped and #VYX-002 L-shaped wall mounting brackets for #VA1DA-10 point light sensors, connected to #LD Light Modules. Provide #ARC-SL-10 Arc Fiber Cables (numbers and lengths as shown on Drawings), in live bus compartments to #3LX Fiber Optic Loop Modules. Provide #VX001-10 Arc Modular Cables with RJ-45 connectors (numbers and lengths as shown on Drawings), between I/O modules, and to VAMP 321 relay. Provide VAMP Software Version V2.2.1191 on EPM server and CAT6 comms cable with RJ-45 connectors from VAMP 321 relay to N-Tron Ethernet Switch in the same lineup.

Q. Surge Arresters: Provide 3-36 kV heavy duty distribution class surge arresters connected on the losd (bus) side of main breaker. Surge arrester mounting is not permitted in LADWP incoming line termination section.

R. Lockout Relay: Provide lockout relay for main and each feeder breaker.

S. Transformer Connections:

1. Where indicated on Drawings, provide a bus transition section for connection to Power Cast II solid dielectric dry type transformer. Transformer manufacturer shall provide bussing details for matching switchgear connections.

2. Provide insulated copper bus connection from circuit breaker. Cable connections are not acceptable for close-coupled connections. Underground conduit and cable connections are acceptable for non-close-coupled connections to dry-type transformers.

3. Provide matching cutout and bolt connections to transformer through details to maintain NEMA 3R enclosure integrity.

2.3 FABRICATION

A. Construction: Each equipment section shall be a separately constructed cubicle assembled to form a rigid free standing unit minimum sheet metal thickness shall be 11 gauges on exterior surfaces. Front and rear doors shall be provided. Each individual section shall be braced to prevent distortion. Provide walk-in house with side-door entrances and egresses and LED exit lights above the doors. Provide sealed LED fixtures mounted to structure and 3-way light/motion switches at door.

B. Contractor shall notify Engineer 48 hours before delivery.

2.4 FACTORY FINISHING

A. Metal surfaces shall be painted with a dry powder epoxy coating for porcelain-type finish. The bare metal shall be prepared by running the material through a minimum 5-stage automatic washing process using high temperature, high pressure chemical solutions to thoroughly cleanse and etch the metal. The powder shall be applied by electrostatic process, and then be cured in a conventional heating bake oven for a hard, scratch resistant finish.

B. Factory production tests see IEEE C37.20.2 Section 5.3.

C. Production tests for metal-clad switchgear shall be low frequency dielectric, mechanical tests of circuit breaker and racking mechanism, electric/functional operation of breakers in cell for both test and connected positions, and control and instrument transformer wiring not involved in the functional testing. Tests on each unit of equipment shall include but not be limited to:

1. Mechanical operation test per 5.3.2 shall be completed before any other required ANSI tests are completed. Include racking mechanism, shutter functionality, mechanical interlocks, TOC and MOC contact operation and interchangeability of like breaker removable elements.

2. Dielectric per 5.3.1 and general requirements of 5.2.1. For 34.5 kV switchgear test voltage is 80 kV. Test shall be made between each phase and phase to ground for 1 minute. Leakage currents shall be recorded and included with test report.

3. Sequence Test (Control Circuit Continuity) per 5.3.4.1 and 5.3.4.4. Control power shall be supplied to switchgear by manufacturer for functional testing of breaker close and trip circuit in test and connected positions.

4. Polarity verification of current transformers and voltage transformers shall be completed per 5.3.4.3.

2.5 SHORT CIRCUIT, COORDINATION, AND ARC FLASH STUDY

A. Switchgear manufacturer shall conduct and submit short circuit, coordination power system, and arc flash studies to include coordination with the load as indicated on Drawings and shall furnish arc flash labels.

B. The studies shall account for fault current contributions from the two vessels at Berths 49 and future Berth 46, where applicable, and ensure coordination between ship and shore protection systems

C. Switchgear manufacturer’s engineering services engineer shall set the protective relay devices based on the coordination study report.

2.6 UNDERWRITERS LABORATORY FIELD EVALUATION AND CERTIFICATION

A. 38 kV metal-clad switchgear, including but not limited to its components, housing, assembly and operation, shall be field evaluated and certified by Underwriters Laboratory field inspection services and shall be Underwriters Laboratory, Incorporated (UL) labeled.

B. Manufacturer shall coordinate and obtain UL field evaluation and certification at the factory, prior to shipment.

C. Manufacturer shall arrange necessary factory visit(s) of UL evaluation staff, pay for costs, including but not limited to UL field evaluation and certification fees, UL staff factory visit travel expenses, transportation (air and ground), lodging, and per diem costs. During the first visit UL staff shall review the switchgear and, in the event of required correction, shall submit a written correction list to the manufacturer.

D. Manufacturer shall comply with UL field evaluation correction items and shall correct the conditions in compliance with UL field evaluation requirements at no additional cost. In the event of the correction compliance requiring a follow-up UL staff factory visit, the manufacturer shall pay for costs, including but not limited to fees, travel expenses, transportation (air and ground), lodging and per diem costs for UL field staff.

E. Upon completion of the corrections, and as required by UL, manufacturer shall comply with the following:

1. Manufacturer shall obtain final UL factory field evaluation and approval certificate from UL and shall submit the original of this certificate to Engineer within 15 calendar days of obtaining certificate.

2. Manufacturer shall include a copy of UL factory field evaluation and approval certificate in the transformer’s operation and maintenance manual and shall submit the operation and maintenance manual in conformance with requirements of these specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Contractor shall visibly inspect and confirm that items and accessories have been received and are in conformance with Specifications and Drawings. Verify field measurements are as shown on approved shop drawings.

B. Contractor shall verify that control power is available, external or internal, for HVAC circuits in outdoor walk-in NEMA 3R equipment. Heaters shall be energized to control temperature and condensation during the time equipment is not energized.

3.2 INSTALLATION

A. Work of assembly in the field by the electrical contractor shall consist of unloading, setting, aligning, leveling, and fastening the stationary housing to the concrete slab, connecting bus Work, cables at shipping splits, and attaching power, and control cables at appropriate terminals.

B. Switchgear shall be installed in conformance with manufacturer's written instructions, applicable requirements of National Electrical Code (NEC) and in conformance with recognized industry practices.

C. Where switchgear is shipped in sections, contractor shall assemble into a complete switchgear line-up. Primary bus connections shall be installed and torqued in conformance with manufacturer's written instructions. Install bus splice insulating boots.

D. Low voltage control wiring splices shall be completed including communication cable connections for EPM system. Switchgear, transformer, and EPM system interconnect wiring shall be continuous with no splices between equipment.

E. Verify that primary cable connections for surge arresters have been completed with proper spacing between conductors.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Contractor shall engage manufacturer's factory engineer for field inspection and testing of the switchgear. Switchgear manufacturer shall provide the services of 1 factory-certified engineer for a period of 4 days on-site. Factory engineer shall assist Contractor with proper installation of switchgear, and shall provide training for Port of Los Angeles Construction and Maintenance Personnel. Refer to ELECTRICAL SYSTEMS AND PRODUCTS MANUFACTURER'S CERTIFICATION, QUALITY ASSURANCE, AND WARRANTY VERIFICATION Section for additional requirements.

2. Contractor shall provide detailed start-up and testing procedure based on component material as part of the switchgear.

3. Circuit breakers shall be operated mechanically and electrically in drawout positions. Breakers shall be racked into connected position and out of cell to test and disconnect positions. Verify TOC and MOC contact operations. Verify operation of any key interlocks that may be part of switchgear.

4. Perform low frequency withstand test in conformance with IEEE C37.20.2 paragraph 5.5. Field test voltage shall not exceed 75 percent of factory test value of 80 kV AC. If equipment has been stored for a long period of time during construction accumulating dust, dirt, moisture, and/or other contaminants, it shall be restored to good condition before field dielectric tests are performed.

5. Contractor shall repair paint chips and scratches with manufacturer supplied paint.

6. Contractor shall engage manufacturer’s engineering services engineer to set relays in conformance with the short circuit current and coordination study.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. General purpose transformers.

B. K-factor transformers rated for nonlinear loads.

C. Shielded transformers.

D. Small power centers.

1.2 RELATED SECTIONS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems

B. Section 26 05 33.13 - Conduit for Electrical Systems

C. Section 26 05 48 - Vibration and Seismic Controls for Electrical Systems

D. Section 26 05 53 - Identification for Electrical Systems

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 REFERENCES

A. IEEE C57.96 - IEEE Standard Guide for Loading Dry-Type Distribution and Power Transformers.

B. NEMA ST 20 - Dry Type Transformers for General Applications.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate Work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances required by NFPA 70.

1.6 SUBMITTALS

A. Product Data: Include voltage, kVA, impedance, tap configurations, insulation system class and rated temperature rise, efficiency, sound level, enclosure ratings, outline and support point dimensions, weight, required clearances, service condition requirements, and installed features.

1. K-factor Rated Transformers: Include K-factor ratings.

2. Shielded Transformers: Include shielding method and noise attenuation performance.

3. Small Power Centers: Include panelboard bus ampacity, integrated short circuit ampere rating, and circuit breaker sizes and ampere ratings.

B. Shop Drawings: Provide dimensioned plan and elevation views of transformers with required clearances indicated.

1. Small Power Centers: Include panel arrangements.

C. Source Quality Control Test Reports: Include reports for tests designated in NEMA ST 20 as design and routine tests.

D. Manufacturer's Installation 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.

E. Maintenance Data: Include recommended maintenance procedures and intervals.

1.7 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 3 years documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store units in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle units in conformance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle unitscarefully to avoid damage to transformer internal components, enclosure, and finish.

1.9 FIELD CONDITIONS

A. Ambient Temperature: Do not exceed the following maximum temperatures during and after installation of transformers.

1. Greater than 10 kVA: 104 degrees Fahrenheit (F) maximum.

2. Less than 10 kVA: 77 degrees F maximum.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Eaton Corporation: www.eaton.com.

B. Schneider Electric: www.se.com.

2.2 TRANSFORMERS - GENERAL REQUIREMENTS

A. Description: Factory-assembled, dry type transformers for 60 Hz operation designed and manufactured in conformance with NEMA ST 20 and listed, classified, and labeled as suitable for the purpose intended.

B. Seismic Qualification: Provide transformers suitable for application under seismic design criteria in conformance with VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS Section where required. Include certification of compliance with submittals.

C. Unless noted otherwise, transformer ratings indicated are for continuous loading according to IEEE C57.96 under the following service conditions:

1. Altitude: Less than 3,300 feet.

2. Ambient Temperature:

a. Greater than 10 kVA: Not exceeding 104 degrees F.

b. Less than 10 kVA: Not exceeding 77 degrees F.

D. Core: High grade, non-aging silicon steel with high magnetic permeability and low hysteresis and eddy current losses. Keep magnetic flux densities substantially below saturation point, even at 10 percent primary overvoltage. Tightly clamp core laminations to prevent plate movement and maintain consistent pressure throughout core length.

E. Impregnate core and coil assembly with non-hydroscopic thermo-setting varnish to effectively seal out moisture and other contaminants.

F. Basic Impulse Level: 10 kV.

G. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.

H. Isolate core and coil from enclosure using vibration-absorbing mounts.

I. Nameplate: Include transformer connection data, ratings, wiring diagrams, and overload capacity based on rated winding temperature rise.

2.3 GENERAL PURPOSE TRANSFORMERS

A. Description: Self-cooled, two winding transformers listed and labeled as complying with UL 506 or UL 1561; ratings as indicated on the drawings.

B. Insulation System and Allowable Average Winding Temperature Rise:

1. Less than 15 kVA: Class 180 degrees Celsius (C) insulation system with 115 degrees C average winding temperature rise.

2. 15 kVA and Larger: Class 220 degrees C insulation system with 150 degrees C average winding temperature rise.

C. Coil Conductors: Continuous aluminum windings with terminations brazed or welded.

D. Energy Efficiency: Comply with 10 CFR 431, Subpart K.

E. Sound Levels: Standard sound levels complying with NEMA ST 20

2.4 SHIELDED TRANSFORMERS

A. Description: Self-cooled, two winding, shielded isolation transformers listed and labeled as complying with UL 506 or UL 1561; ratings as indicated on the drawings.

B. Insulation System and Allowable Average Winding Temperature Rise:

1. Less than 15 kVA: Class 180 degrees C insulation system with 115 degrees C average winding temperature rise.

2. 15 kVA and Larger: Class 220 degrees C insulation system with 150 degrees C average winding temperature rise.

C. Coil Conductors: Continuous aluminum windings with terminations brazed or welded.

D. Energy Efficiency: Comply with 10 CFR 431, Subpart K.

E. Sound Levels: Standard sound levels complying with NEMA ST 20

F. Winding Shield: Electrostatic, with separate insulated grounding connection.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that suitable support frames and anchors are installed where required and that mounting surfaces are ready to receive transformers.

3.2 INSTALLATION

A. Perform Work in conformance with NECA 1 (general workmanship).

B. Install transformers in conformance with NECA 409 and IEEE C57.94.

C. Arrange equipment to provide minimum clearances as specified on transformer nameplate and in conformance with manufacturer's written instructions and NFPA 70.

D. Provide grounding and bonding in conformance with Section 26 05 26.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in conformance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS Sections 7.2.1.1 and 7.2.1.2. Tests and inspections listed as optional are not required.

3.4 ADJUSTING

A. Measure primary and secondary voltages and make appropriate tap adjustments.

B. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.5 CLEANING

A. Clean dirt and debris from transformer components in conformance with manufacturer's written instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

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 auxillary 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 the 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. Wiring devices

1.2 RELATED SECTIONS

A. Section 26 05 33 - Raceways and Boxes 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. 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.

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 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

2.3 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.

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 branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

A. 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 receptacles with grounding pole on top.

E. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

F. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

G. Connect wiring devices by wrapping conductor around screw terminal.

H. Use jumbo size plates for outlets installed in masonry walls.

I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, and on surface mounted outlets.

J. 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.

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.

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. Fuses.

1.2 RELATED SECTIONS

A. Section 26 05 53 - Identification for Electrical Systems

B. Section 26 24 13 - Switchboards

C. 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 REFERENCES

A. NEMA BI 50009 - Low Voltage Cartridge Fuses.

B. NFPA 70 - National Electrical Code.

C. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements.

D. UL 248-4 - Low-Voltage Fuses - Part 4: Class CC Fuses.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's standard data sheets including voltage and current ratings, interrupting ratings, time-current curves, and current limitation curves.

1. Spare Fuse Cabinet: Include dimensions.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 3 years documented experience.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Bussmann, a division of Eaton Corporation: www.cooperindustries.com.

B. Littelfuse, Inc: www.littelfuse.com/.

C. Mersen: ep-us.mersen.com.

2.2 APPLICATIONS

A. Primary Protection for Control Transformers: Class CC, time-delay.

2.3 FUSES

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless specifically indicated to be excluded, provide fuses for fusible equipment as required for a complete operating system.

C. Provide fuses of the same type, rating, and manufacturer within the same switch.

D. Comply with UL 248-1.

E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA BI 50009, Class and ratings as indicated.

F. Voltage Rating: Suitable for circuit voltage.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that fuse ratings are consistent with circuit voltage and manufacturer's written instructions and nameplate data for equipment.

3.2 INSTALLATION

A. Install fuses with label oriented such that manufacturer, type, and size are easily read.

B. Install spare fuse cabinet where indicated.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Charger/rectifier units

B. Inverter units

1.2 RELATED SECTIONS

A. Section 26 05 29 - Hangers and Supports for Electrical Systems

B. Section 26 05 48 - Vibration and Seismic Controls 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. IEEE 519 - IEEE Standard for Harmonic Control in Electric Power Systems.

B. NEMA PE 1 - Uninterruptible Power Systems (UPS) - Specification and Performance Verification.

C. NFPA 70 - National Electrical Code.

1.5 SUBMITTALS

A. Submit the following to Engineer within 14 Calendar Days of Notice to Proceed (NTP):

1. Shop Drawings: Indicate electrical characteristics and connection requirements. Provide battery rack dimensions; battery type, size, dimensions, and weight; detailed equipment outlines, weight, and dimensions; location of conduit entry and exit; single-line diagram indicating metering, control, and external wiring requirements; heat rejection and air flow requirements.

2. Product Data: Provide catalog sheets and technical data sheets to indicate physical data and electrical performance, electrical characteristics, and connection requirements.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

C. Operation Data: Description of operating procedures.

D. Maintenance Data: Description of servicing procedures; list of major components; recommended remedial and preventive maintenance procedures; spare parts list.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 3 years documented experience with service facilities within 100 miles of Project.

C. Supplier Qualifications: Authorized distributor of specified manufacturer with minimum 3 years documented experience.

D. Products: Listed, classified, and labeled as suitable for the purpose intended.

E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Uninterruptible Power Supply (UPS) System:

1. Eaton Corporation: www.eaton.com.

2. Schneider Electric: www.se.com.

2.2 UNINTERRUPTIBLE POWER SUPPLY (UPS) SYSTEMS

A. System Configuration: Non-redundant type with reverse transfer. Designed for capacity expansion by addition of parallel modules in field with minimum downtime.

B. Components:

1. Battery.

2. Rectifier/charger to maintain battery charge and to provide input to inverter when utility power is available.

3. Inverter to provide power to load during normal operation.

C. Design Standards: IEEE 519 and NEMA PE 1.

2.3 SYSTEM RATINGS AND OPERATING CHARACTERISTICS

A. System Continuous Rating: As indicated on Drawings, over entire battery voltage range at specified power factor. Maintain output voltage within specified limits at any load from full load to no-load.

2.4 DESIGN

A. Inverter Type: Pulse-width modulated.

2.5 FABRICATION

A. Conversion Equipment Enclosure: NEMA EN 10250, Type 1 enclosure allowing access from front for servicing adjustments and connections. Access through hinged door equipped with tumbler lock and latch handle. Equip cabinet for fork truck lifting.

2.6 BATTERY

A. Storage Battery: Lead calcium heavy duty industrial battery, designed for auxiliary power service. Provide battery with impact resistant plastic case. Provide cells with explosion proof vents, clear containers, and ample space for plate growth without stressing container and cover.

B. Electrolyte Specific Gravity: No greater than 1.250 when full charged and measured at 77 degrees Fahrenheit (F).

2.7 CONTROLS AND INDICATORS

A. External Connectivity: Provide remote interface connection.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install as integral part of switchgear enclosure.

B. Provide required seismic controls in conformance with VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS Section.

3.2 FIELD QUALITY CONTROL

A. Verify specification performance criteria.

B. Measure battery discharge and recharge times.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Transfer switches for low-voltage (600 V and less) applications and associated accessories:

1. Automatic transfer switches.

2. Nonautomatic transfer switches.

3. Includes service entrance rated transfer switches.

1.2 RELATED SECTIONS

A. 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. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

B. NEMA ICS 10 Part 1 - Industrial Control and Systems Part 1: Electromechanical AC Transfer Switch Equipment.

C. NFPA 70 - National Electrical Code.

D. UL 1008 - Transfer Switch Equipment.

1.5 QUALITY ASSURANCE

A. Comply with the following:

1. NFPA 70 (National Electrical Code).

2. NFPA 110 (Standard for Emergency and Standby Power Systems); meet requirements for Level 2 system.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience with power transfer systems of similar size, type, and complexity; manufacturer's authorized installer.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store transfer switches in conformance with manufacturer's instructions.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in conformance with manufacturer's instructions to avoid damage to transfer switch components, enclosure, and finish.

1.7 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.8 WARRANTY

A. Provide minimum one year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Transfer Switches:

1. Schneider Electric; ASCO Power Technologies: www.ascopower.com.

2. Thomson Power Systems: www.thomsonps.com.

2.2 TRANSFER SWITCHES

A. Provide complete power transfer system consisting of required equipment, conduit, boxes, wiring, supports, accessories, system programming, and the like as necessary for a complete operating system that provides the functional intent indicated.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Construction Type: Either "contactor type" (open contact) or "breaker type" (enclosed contact) transfer switches complying with specified requirements are acceptable.

D. Automatic Transfer Switch:

1. Transfer Switch Type: As shown on Drawings.

2. Transition Configuration: As shown on Drawings.

3. Voltage: As shown on Drawings.

4. Ampere Rating: As shown on Drawings.

5. Neutral Configuration: Solid neutral (unswitched), except as indicated.

6. Load Served: As shown on Drawings.

7. Primary Source: As shown on Drawings.

8. Alternate Source: As shown on Drawings.

9. Products:

a. Schneider Electric; ASCO 7000 Series Automatic Transfer Switches: www.ascopower.com.

b. Thomson Power Systems TS 880 Series: www.thomsonps.com.

E. Basis of Design - Automatic Transfer Switch: Schneider Electric; ASCO 7000 Series: www.ascopower.com.

1. Service-Entrance Switch:

a. Frame: 70 A to 225 A; open transition only.

b. Transition Configuration, Dual Service Entrance Breakers: Open transition.

c. Neutral Configuration: Solid neutral.

d. Phase Poles: As indicated on drawings.

e. Ampere Rating: As indicated on drawings.

f. Voltage: As indicated on drawings.

g. Enclosure: As required for installed location.

2. Provide the following:

a. Auxiliary power connections; wired to external 120 VAC source.

b. Extended control power ride-through, 25 seconds.

c. Manual retransfer selector switch.

d. Load-shedding circuit; initiated by opening of contact.

e. Form C contacts rated at 6A; two sets.

f. Push-to-test feature for pilot light indicators.

g. Remote ethernet monitoring.

h. Surge protective device, load side protection; 200 kA per phase, 3-phase, 4-wire, wye.

i. Certification of compliance with American Recovery and Reinvestment Act.

j. Auxiliary contact; closed when transfer switch is in "Automatic" position.

k. Digital power meter.

l. Strip heater with thermostat.

F. Nonautomatic Transfer Switch:

1. Transfer Switch Type: As shown on Drawings.

2. Transition Configuration: As shown on Drawings.

3. Voltage: As shown on Drawings.
4. Ampere Rating: As shown on Drawings.
5. Neutral Configuration: Solid neutral (unswitched), except as indicated.
6. Load Served: As shown on Drawings.
7. Primary Source: As shown on Drawings.
8. Alternate Source: As shown on Drawings.
9. Products:
    a. Schneider Electric; ASCO 7000 Series Nonautomatic Transfer Switches: www.ascopower.com/.
    b. Thomson Power Systems TS 880 Series: www.thomsonps.com/.

G. Basis of Design - Nonautomatic Transfer Switch: Schneider Electric; ASCO 7000 Series: www.ascopower.com/.

1. Service-Entrance Switch:
    a. Frame: 70 A to 225 A; open transition only.
    b. Transition Configuration, Dual Service Entrance Breakers: Open transition.
    c. Neutral Configuration: Solid neutral.
    d. Phase Poles: As shown on Drawings.
    e. Ampere Rating: As shown on Drawings.
    f. Voltage: As shown on Drawings.
    g. Enclosure: As required for installed location.
2. Provide the following accessories:
    a. Auxiliary power connections; wired to external 120 VAC source.
    b. Extended control power ride-through, 25 seconds.
    c. Manual retransfer selector switch.
    d. Load-shedding circuit; initiated by opening of contact.

e. Form C contacts rated at 6A; two sets.

f. Push-to-test feature for pilot light indicators.

g. Remote ethernet monitoring.

h. Surge protective device, load side protection; 200 kA per phase, 3-phase, 4-wire, wye.

i. Certification of compliance with American Recovery and Reinvestment Act.

j. Auxiliary contact; closed when transfer switch is in "Automatic" position.

k. Digital power meter.

l. Strip heater with thermostat.

H. Comply with NEMA ICS 10 Part 1, and list and label in conformance with UL 1008 for the classification of the intended application (e.g. emergency, optional standby).

I. Do not use double throw safety switches or other equipment not specifically designed for power transfer applications and listed as transfer switch equipment.

J. Load Classification: Classified for total system load (any combination of motor, electric discharge lamp, resistive, and tungsten lamp loads with tungsten lamp loads not exceeding 30 percent of the continuous current rating) unless otherwise indicated or required.

K. Switching Methods:

1. Obtain control power for transfer operation from line side of source to which the load is to be transferred.

L. Service Conditions: Provide transfer switches suitable for continuous operation at indicated ratings under the service conditions at the installed location.

M. Enclosures:

1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:

2. Finish: Manufacturer's standard unless otherwise indicated.

N. Short Circuit Current Rating:

1. Withstand and Closing Rating: Provide transfer switches, when protected by the supply side overcurrent protective devices to be installed, with listed withstand and closing rating not less than the available fault current at the installed location as indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings and configurations of transfer switches are consistent with the indicated requirements.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cathodic protection system for the steel pipe piles.

B. Corrosion protection for the submerged surfaces of the steel pipe piles.

1.2 RELATED SECTIONS

A. Section 09 96 20 - Corrosion Control

B. Section 31 62 17 - Steel Pipe Piles

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Cathodic Protection ~~Electrical System~~ bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. NACE SP0169 - Control of External Corrosion on Underground or Submerged Metallic Piping Systems.

B. SSPC-SP 10/NACE No.2 - Near-White Metal Wet Abrasive Blast Cleaning.

1.5 SUBMITTALS

A. Detailed drawings with design calculations for the cathodic protection system with complete installation details.

B. The following certifications of experience and qualifications to perform Work:

1. The name of the firm with a minimum of 5 years experience in the corrosion field.

2. Proof of a licensed engineer registered in State of California as a professional corrosion engineer and is accredited by National Association of Corrosion Engineers (NACE) as a corrosion specialist.

C. Mill certificates by the vendor to Engineer for each alloy melt used in the production of anodes produced. The certificate shall indicate:

1. Alloy chemical composition

2. Alloy closed circuit potential

3. Alloy efficiency

4. Number of anodes produced from each melt

5. Net weight of each anode

D. Written report of the testing with data tabulated and as-built drawings as described in Field Quality Control Article of this Section to Engineer 14 days after the testing has been completed.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

A. This is a design/build performance specification.

B. Detailed drawings with design calculations shall be prepared for the cathodic protection system with complete installation details and shall be submitted to Engineer for approval. Plans and calculation for the cathodic protection shall be prepared and signed by a State of California registered corrosion engineer.

C. Cathodic protection system shall be of the sacrificial anode type utilizing aluminum anodes.

D. The design life of the cathodic protection system shall not be less than 15 years.

E. The current density for the cathodic protection system for the sheet steel piles shall be as follows:

1. In seawater: 5 milliamperes per square foot (mA/sq ft)

2. In mud zone: 3 mA/sq ft

F. The design seawater resistivity shall be based on 20 to 25 ohm centimeter (cm) resistivity for seawater.

2.2 ALUMINUM ANODES (GALVALUM III)

A. Aluminum anodes shall be high-purity aluminum-zinc-indium alloy and shall be Galvalum III. The current capacity of the anodes shall be a minimum 1,150 ampere-hours per pound. Normal consumption shall be 7.6 pounds per amp year. The voltage range shall be 1.11 volts to 1.17 volts (CU-CUS04 reference electrode). Conduct factory tests on samples poured from the same batch as production anodes.

B. Sandblast molds and cores to a near white metal in conformance with SPPC SP 10. The shift foreperson shall verify that the batch meets the chemical specifications before the pour begins. Pour alloy into molds as required to produce the quantity needed. Random anodes shall be checked to ensure that the weight is correct. During the pour, the sampling procedure shall be observed. When the metal has cooled and solidified, stamp each anode with the batch number.

C. Chemical Composition of Aluminum Anodes:

1. Galvalum III anodes shall be produced to the following specification:

% Zinc	2.8	- 6.5
% Indium	0.01	- 0.02
% Iron	0.12	- Maximum
% Silicon	0.08	- 0.20
% Copper	0.006	- Maximum
% Aluminum	Remainder	

2.3 FABRICATION TOLERANCES

A. Tolerances:

1. The average weight of anodes produced for a single contract shall be no less than the nominal weight shown on the approved shop drawings.

2. The weight of individual anodes shall be within plus or minus 3 percent of the weight shown on the approved shop drawings.

3. Length shall be plus or minus 2 percent of the length shown on the approved shop drawings.

4. Anode width and height shall be plus or minus 10 percent of dimensions shown on approved shop drawings.

2.4 SOURCE QUALITY CONTROL

A. Furnish materials, equipment, and qualified personnel to perform the inspection and testing specified. Engineer reserves the right to inspect the anodes during manufacture, including witnessing of testing and review of the original laboratory records, but is in no way obligated to supervise Work. Inspection provided by Engineer shall not relieve Contractor of the responsibility to comply with provisions of Specifications.

B. Quality control samples for chemical analysis shall be taken at the start and at the finish of each melt from which more than 4 anodes are produced. One sample for chemical analysis, taken during the casting, shall be required for melts from which fewer than 4 anodes are produced.

1. One sample from each melt shall be tested for electro-mechanical efficiency and closed-circuit potential.

a. Closed-circuit potential tests shall be conducted on 1 sample taken from each batch. The sample shall be exposed to synthetic seawater and a current density of 4 milliamperes per square inch for a minimum of 3 hours before measurements of closed-circuit potential. The acceptance criteria shall be a mean closed-circuit potential of minus 1.17v CU-CUS04 with a minimum acceptable potential of minus 1.11v.

b. Short duration capacity tests, either impressed current or hydrogen evolution, shall be conducted on 1 sample taken from the batch. The acceptance criteria shall be a mean efficiency of 85 percent with a minimum acceptable of 80.2 percent. If a batch does not meet either of the test criteria, tests shall be conducted on 2 additional samples of the same batch. If the criteria in question is met, the batch shall then be accepted.

2.5 SACRIFICIAL ALUMINUM ANODE SUPPORT HARDWARE

A. Steel mounting hardware for the aluminum anodes shall be sandblasted to near white in conformance with SSPC-SP 10/NACE No.2 and coated in conformance with CORROSION CONTROL Section, except at anode bracket connections to pile. To ensure proper grounding of anode to pile, provide a grounding set screw.

PART 3 - EXECUTION

3.1 INSTALLATION

A. After driving piles, install cathodic protection system in accordance with approved shop drawings and design engineer's specifications for the system.

1. Mount the sacrificial aluminum anodes on the pilings by mechanical means. Either clamp type mounting or threaded stud mounting shall be accepted.

3.2 FIELD QUALITY CONTROL

A. After the cathodic protection equipment is installed, Contractor shall have the system tested in conformance with accepted industry practice. The purpose of the testing shall be to determine if complete cathodic protection has been achieved and if the system complies with Specifications and the criteria for protection as defined in NACE SP0169. The system shall be tested under the direct supervision of a professional corrosion engineer registered in the State of California and accredited by NACE as a corrosion specialist.

B. Upon completion of the cathodic protection system, structure-to-reference cell potential measurements shall be made, using a silver-silver chloride reference electrode and a direct current potentiometer-voltmeter, having an internal resistance (sensitivity) of not less than 100,000 ohms per volt and a full scale of 1 or 2 volts, or an electronic voltmeter with a minimum input resistance of 10 megohm and a full scale of 1 or 2 volts. At a minimum, structure-to-reference cell potential measurements shall be made at 3 locations down each pile.

C. Criteria for Protection:

1. The criteria for determining if complete cathodic protection has been achieved shall be a minimum potential of minus 900 millivolt (mV) to a silver-silver chloride reference electrode at test locations. Contractor shall correct, at no additional cost to Department, deficiencies in materials and installation observed by these tests and inspections. Contractor shall pay for retests made necessary by corrections.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Exterior luminaires.

B. Lamps.

C. Poles and accessories.

D. Luminaire accessories.

1.2 RELATED SECTIONS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems

B. Section 26 05 29 - Hangers and Supports for Electrical Systems

C. Section 26 05 33 - Raceways and Boxes for Electrical Systems

D. Section 26 05 48 - Vibration and Seismic Controls for Electrical Systems

E. Section 26 09 23 - Lighting Control Devices

F. Section 26 27 26 - Wiring Devices

G. Section 26 28 13 - Fuses

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. IES LM-63 - Approved Method: IES Standard File Format for the Electronic Transfer of Photometric Data and Related Information.

B. IES LM-79 - Approved Method: Optical and Electrical Measurements of Solid-State Lighting Products.

C. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources.

D. NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems.

E. NFPA 70 - National Electrical Code.

F. UL 1598 - Luminaires.

G. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products.

1.5 SUBMITTALS

A. Shop Drawings:

1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.

2. Provide photometric calculations where luminaires are proposed for substitution upon request.

B. Product Data: 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, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with proposed features.

1. LED Luminaires:

a. Include estimated useful life, calculated based on IES LM-80 test data.

2. Provide electronic files of photometric data certified by a National Voluntary Laboratory Accreditation Program (NVLAP) lab or independent testing agency in IES LM-63 standard format upon request.

3. Lamps: Include rated life and initial and mean lumen output.

4. Poles: Include information on maximum supported effective projected area (EPA) and weight for the design wind speed.

C. Certificates for Poles and Accessories: Manufacturer's documentation that products are suitable for the luminaires to be installed and comply with designated structural design criteria.

D. Field Quality Control Reports.

1. Include test report indicating measured illumination levels.

E. 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.

F. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle, and store products in conformance with NECA/IESNA 501 and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

PART 2 - PRODUCTS

2.1 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule as shown on Drawings.

2.2 LUMINAIRES

A. Manufacturers:

1. Holophane: https://holophane.acuitybrands.com.

B. Provide products that comply with requirements of NFPA 70.

C. Provide products that are listed and labeled as complying with UL 1598, where applicable.

D. Provide products listed, classified, and labeled as suitable for the purpose intended.

E. Unless otherwise indicated, provide complete luminaires including lamp(s) and sockets, ballasts/drivers, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

F. Unless specifically indicated to be excluded, provide required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

H. LED Luminaires:

1. Components: UL 8750 recognized or listed as applicable.

2. Tested in conformance with IES LM-79 and IES LM-80.

3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

2.3 POLES

A. Manufacturers:

1. Holophane: https://holophane.acuitybrands.com/.

B. Products:

1. Provide poles and associated support components suitable for the luminaire(s) and associated supports and accessories to be installed.

2. Structural Design Criteria:

3. Material: Steel, unless otherwise indicated.

4. Shape: Square straight, unless otherwise indicated.

5. Finish: Match luminaire finish, unless otherwise indicated.

6. Mounting: Install on concrete foundation, height as indicated on the drawings, unless otherwise indicated.

7. Unless otherwise indicated, provide with the following features/accessories:

a. Top cap.

b. Handholesize as shown on Drawings.

c. Anchor base cover.

d. Provision for pole-mounted weatherproof GFI receptacle where indicated.

e. Brackets.

f. Hinged base.

g. Pole-top tenon.

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 at proper mounting heights and are properly sized to accommodate conductors in conformance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Coordinate locations of outlet boxes provided under RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS Section as required for installation of luminaires provided under this section.

B. Install products in conformance with manufacturer's written instructions.

C. Install luminaires in conformance with NECA/IESNA 501.

D. Provide required support and attachment in conformance with HANGARS AND SUPPORTS FOR ELECTRICAL SYSTEMS.

E. Install luminaires plumb and square and aligned with substation fence.

F. Install accessories furnished with each luminaire.

G. Bond products and metal accessories to branch circuit equipment grounding conductor.

H. Install lamps in each luminaire.

3.3 FIELD QUALITY CONTROL

A. Inspect each product for damage and defects.

B. Operate each luminaire after installation and connection to verify proper operation.

C. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Engineer.

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 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. 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, 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 Lump Sum Construction bid item 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 Electrorack Enclosure 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. 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

D. Removing excess earth from Project Site

1.2 RELATED SECTIONS

A. Section 02 41 13 - Selective Site Demolition

B. Section 02 41 16 - Structure Demolition

C. Section 02 61 14 - Excavating, Stockpiling, and Disposing of Chemically Impacted Soil

D. Section 31 23 33 - Trenching and Backfilling

E. Section 32 11 24 - Crushed Miscellaneous Base

F. 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 Trench 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 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

1. Subsection 300-2 - Clearing and Grubbing

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 source, previous uses of the land from which the fill originated, proposed import fill volume from each source, and sampling plan with a map showing depth and location of soil sample collection. After approval of fill 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 proposed analyses.

B. After approval of fill 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):

1. Completed Los Angeles Harbor Department Import Material Checklist form included in Appendix "E" 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:

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.

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 Geotechnical Requirements (from sites off and within Department property):

1. Fill, 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 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 Environmental Requirements (from sites off and within Department property): Import fill material shall conform to properties described in this Section. Refer to Appendix "E" of Specifications for Los Angeles Harbor Department Import Material Checklist.

1. Fill source area 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 shall be tested by Contractor. Import fill 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 material for use at any of its construction sites.

3. Provide written documentation that identifies the proposed fill source, previous uses of the land from which the fill originated, proposed import fill volume from each source, and sampling plan with a map showing depth and location of soil sample collection. After approval of fill 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 to Project Site.

PART 3 – EXECUTION

3.1 CLEARING AND GRUBBING

A. Prepare Project Site by clearing and grubbing as necessary in conformance with RS Subsection 300-1 exclusive of RS Subsections 300-1.3 and 300-1.4.

3.2 SUBGRADE PREPARATION

A. Subgrade preparation shall be in conformance with RS Subsection 301-1 with the exception of compaction and payment requirements.

3.3 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.

3.4 FILL PLACEMENT, GENERAL

A. Fill placement shall be in conformance with RS Subsections 300-4 and 300-5 except for 300-5.4.

3.5 IMPORT FILL

A. Characterization and Testing Requirements:

1. Furnish labor, materials, laboratory analyses and reports, and equipment to characterize proposed import fill soil 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 "E" of Specifications.

2. Notify Engineer at least 72 hours prior to start of proposed import fill soil characterization Work.

3. Characterize proposed import fill soil 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 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.

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 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. Import Soil 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.

C. 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 shall be brought in from contaminated import fill source location.

2) Submit new fill material source location subject to characterization and testing requirements described in this Section.

3) Resume importing fill material after Engineer approves Los Angeles Harbor Department Import Material Checklist from new import fill material source location and other submittals required prior to start of fill soil import Work.

b. Engineer may at times monitor the import soil 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.

3.6 COMPACTION

A. Perform compaction in conformance with BASIC SITE MATERIALS AND METHODS Section.

3.7 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	150	10 X STLC***
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)	2.8	Cal-EPA SWRCB/DTSC**
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***
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**

Chemicals of Concern (COC) Industrial Land Use	Soil/Fill Material Concentration (mg/kg)*	Source
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.

3.8 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.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Trench excavation and backfill operations

1.2 RELATED SECTIONS

A. Section 02 61 14 - Excavating, Stockpiling, and Disposing of Chemically Impacted Soil

B. 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 Lump Sum Construction bid item of Bid Proposal Line Items.

   b. Trenches in areas of new, full depth asphalt concrete pavement and existing pavement to be overlaid with new pavement: Trench excavation and backfill shall be paid under the Lump Sum Construction bid item of Bid Proposal Line Items. Asphalt concrete trench surfacing shall be paid under Asphalt Concrete Paving bid item of Bid Proposal Line Items.

   c. Trenches in areas of new, full depth concrete pavement: Trench excavation and backfill shall be paid under the Lump Sum Construction 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 Lump Sum Construction bid item 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

B. Section 31 00 00 - Earthwork

C. 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 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 Administration (OSHA), 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. Permit requirements to transport prestressed concrete piles

1.2 RELATED SECTIONS

A. Section 01 32 35 - Panoramic Photographic Documentation

B. Section 02 41 13 - Selective Site Demolition

C. Section 02 41 16 - Structure Demolition

D. Section 35 54 00 - Concrete Wharf Construction

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) 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.

7) Survey Work.

2. Furnish 24-Inch Square Prestressed Concrete Piles:

a. Quantities of 24-inch square prestressed 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 square 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 Square Prestressed Concrete Piles:

    a. Quantities of 24-inch square prestressed 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 square prestressed 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. Refer to CONCRETE WHARF CONSTRUCTION Section.

        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 square Concrete Production Piles Paragraph of this Article. Refer to CONCRETE WHARF CONSTRUCTION Section if forming modifications are required or additional reinforcing is required.

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. Restrike 24-Inch Square 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.~~

c. ~~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. Break Off and Dispose of 24-Inch Square Prestressed 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.

    d. Refer to SELECTIVE SITE DEMOLITION Section for break off and disposal of existing piles.

1.4 REFERENCES

A. ASTM A416/A416M - Standard Specification for Low-Relaxation, Seven-Wire Steel Strand for Prestressed Concrete.

B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

C. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

D. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.

E. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

F. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

G. ASTM C88/C88M - Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.

H. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

I. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.

J. ASTM C150/C150M - Standard Specification for Portland Cement.

K. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

L. ASTM C470/C470M - Standard Specification for Molds for Forming Concrete Test Cylinders Vertically.

M. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.

N. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

O. PCI MNL-116 - Manual for Quality Control for Plants and Production of Structural Precast Concrete Products.

P. 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 201-4 - Concrete Curing Materials

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. 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.

G. PDA (Pile Driving Analyzer): PDA measures pile vibration during driving for strength and resistance of pile in soil.

H. Pile Tip: Bottom end of pile. Synonymous with pile toe.

I. Pile Top: Top end of pile. Synonymous with pile head.

J. 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.

K. 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.

L. 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.

M. Set: Pile penetration in inches per blow.

N. Sweep: Deviation from straightness measured along each of 2 perpendicular faces of the pile while not subject to bending forces.

O. 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.

P. 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.

Q. 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.

R. 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 201-1.2.7, 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, and 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, internal jetting devices 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 of 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. 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 calibration of flowmeter and pressure gage used for measuring flow rates and water pressures at jetting pump. Certificates shall be traceable to National Institute of Standards and Technology (NIST).

5. 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.
6. Certificates of compliance, samples, and test results for cement, aggregates, and admixtures.
7. Certificates of jack calibration curves used in prestressing. Certificates shall be traceable to NIST.
8. Description of plant quality control procedures demonstrating substantial compliance with PCI MNL-116.
9. 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, and jetting pressure 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.

G. 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.

H. 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.

3. Procedures used to spud piles.

4. Locations of piles that were cut off and removed.

I. Submittals Made After Pile Driving:

1. Results of surveys in a report format no later than 10 Calendar Days after completion of pile driving.

J. 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.

C. Pile driving contractor qualifications: Competent pile driving contractor specializing in placement of marine concrete piles.

1. Experience: 5 years of 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 201-1.1.5, 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 201-1.5.3 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 201-1.7. 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 100 foot long 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. 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 201-1.2.4.

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 201-1.4.2. 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 201-1.2.5.

D. Fly ash shall be Class F, conforming to RS Subsection 201-1.2.7 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 to ASTM A615/A615M Grade 60.

2. Steel material for reinforcing bars with upstands (dowels) shall conform to CONCRETE WHARF CONSTRUCTION Section.

K. Pile Buildup Materials:

1. Concrete shall conform to CONCRETE WHARF CONSTRUCTION Section.

2. Steel material for reinforcing bars with upstands (dowels) shall conform to CONCRETE WHARF CONSTRUCTION Section.

3. Steel spiral shall conform to ASTM A1064/A1064M.

4. Neat cement grout for dowel anchorage shall conform to CONCRETE WHARF CONSTRUCTION Section.

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 shall 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 of 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 of 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. 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.

2. 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.

3. 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 shall 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 "B" 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. 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.

3. 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.

4. 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).

5. Provide hearing protection as required by Occupational Safety and Health Administration (OSHA).

6. 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 jetting and 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, Jetting, Hammer Fuel Settings, or Energy Settings: Terminate jetting, change pile cushions, or change hammer fuel or energy settings when requested by Engineer. Carefully control jetting to prevent damage to the foundation materials around existing piles that may cause a reduction in the piles' bearing capacity.

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. Accuracy of Driving:

    a. Piles shall be driven with an inclination of not more than 2 percent from the vertical and the pile tops shall not vary from the design position shown by more than 2 inch.

7. 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.

8. 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.

9. Termination of Installation:

    a. Contractor shall follow the pile driving criteria provided by Engineer after completion of the indicator pile program.

10. 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.

11. 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.

12. Surveying Pile Positions and Inclinations: Perform periodic pile survey Work during pile driving operations.

3.3 OBSERVATIONS AND RECORDING OF PILE BEHAVIOR

A. Observe and record the following data for each pile during both initial installation:

1. Pile number, length, depth of embedment, and mudline elevation at the start and completion of driving.

2. Type of hammer, jetting equipment, 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 and jetting record for each foot of installation. Include the jetting pressures, the time periods required to start and stop jetting, pile toe elevations at the beginning and end of jetting operations, and the average rate of penetration (sec/foot) during jetting for the entire length of pile.

5. Number of hammer blows per foot of penetration for each foot of driving including periods when jetting and 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 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.

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.

3.5 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.

3.6 PILE BUILDUP

A. 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 wharf deck structure above the pile by Contractor without extra compensation.

B. 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.

C. 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.

D. 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.

E. Pile buildups shall be constructed as shown on Drawings, or as otherwise directed by Engineer.

3.7 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.

3.8 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 _____ Type: _____ Serial No. _____ Rated Hammer Energy _____ at _____Length of Stroke Explosive Force _____
HYDRAULIC HAMMER	Manufacturer _____ Model _____ Type: _____ Serial No. _____ Rated Hammer Energy _____ at _____Length of Stroke
VALVES	Location of Valves with Respect to Top of Cap Block in Inches Intake _____ Cut-off _____
RAM	Ram Weight _____Ram Length _____ Ram Cross Sectional Area: _____(For diesel hammer)
ANVIL	(With diesel hammers) Anvil Weight _____
CAPBLOCK	Material _____ Area _____ Thickness_____ Modulus of Elasticity-E _____ (P.S.I.) Coefficient of Restitution – e _____
PILE CAP	Helmet Bonnet Weight _____ Anvil Block Drivehead
CUSHION	Cushion Material _____ Area _____ Thickness _____ Modulus of Elasticity-E _____ (P.S.I.) Coefficient of Restitution - e _____

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fabricate and install steel pipe piles.

1. Installation techniques necessitated by slope revetment with armor rock and riprap are not in the scope of this Specification and are the responsibility of Contractor.

2. Costs for temporary removal and repair of slope revetment with armor rock and riprap are included in the pile installation bid item.

B. Staylath

1.2 RELATED SECTIONS

A. Section 05 05 24 - Structural Welding

B. Section 05 12 02 - Structural Steel

C. Section 05 12 24 - Structural Steel Tests and Inspections

D. Section 09 96 00 - High-Performance Coatings

E. Section 26 42 13 - Cathodic Protection

F. Section 35 54 00 - Concrete Wharf Construction

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Cost to furnish, fabricate, coat, and deliver to Project Site steel pipe piles including furnishing extra length of pile for cutoff, additional driving, and installation purposes shall be paid under each corresponding bid items of Bid Proposal Line Items as follows:

a. Furnish 36-Inch Steel Pipe Piles.

1) Quantities of 36-inch steel 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 steel piles (except for those specifically ordered as surplus), piles damaged during handling, transporting, installing, or otherwise not requested by Department.

2) Items considered incidental in the cost of furnishing the piles include, but are not limited to:

a) Pile cushions.

b) Other incidental items previously specified in this Section.

2. Cost to drive and install steel pipe piles including temporary relocation of existing riprap, investigation of obstructions, drivability analysis, dynamic monitoring, vibration monitoring, and measures to protect adjacent existing utility lines shall be paid under each corresponding unit price bid items of Bid Proposal Line Items as follows:

a. Install 36-Inch Steel Pipe Piles.

3. Cost to furnish and install cathodic protection to the steel pipe piles shall be paid under the Cathodic Protection bid item of Bid Proposal Line Items.

4. Restrike 36-Inch Steel PipePiles (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.~~

c. ~~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.~~

d. Cost to restrike steel pipe piles shall be paid under the Restrike 36-Inch Steel Piles Contingency bit item of Bid Proposal Line Items.

5. Cost to perform spudding of obstructions encountered during pile driving shall be paid under the Spudding of Obstructions bid item of Bid Proposal Line Items.

a. Spudding of Obstructions (Contingency Item):

1) This bid item shall include costs for removal and re-driving of the pile and spudding of the obstruction.

2) 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.

3) Measurement for spudding of obstructions shall be for each obstruction at which spudding was attempted.

4) 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. Cost to furnish and install staylath to the steel pipe piles shall be paid under the Staylath bid item of Bid Proposal Line Items.

7. Cost to remove and dispose of soil plug inside steel pipe piles including cleaning inside of piles shall be paid under the Soil Plug Removal Contingency bid item of Bid Proposal Bid Items.

1.4 REFERENCES

A. ACI PRC-347 - Guide to Formwork for Concrete.

B. API Spec 5L - Line Pipe.

C. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

D. AWS D1.1/D1.1M - Structural Welding Code - Steel.

E. AWWA C200 - Steel Water Pipe, 6 in. (150 mm) and Larger.

1.5 DEFINITIONS

A. 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.

B. Impact Stress: The stress transferred to the pile head at impact from the driving train, as determined from measurements using PDA.

C. 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.

D. PDA (Pile Driving Analyzer): Used for monitoring pile stresses and estimating capacity during pile driving.

E. Pile Diving Criteria - Based on the test pile results, Engineer 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.

F. Practical Refusal Resistance: The point at which it is not reasonable to continue driving a particular pile. Practical refusal criteria shall be established following the indication pile program. However, for bidding purposes it is defined as a penetration resistance of at least 120 blows per foot for 1 foot, a penetration resistance of at least 80 blows for 6 inches, or a penetration resistance of 30 blows for one inch, whichever comes first. The practical refusal penetration resistance shall apply only for hammer sizes as specified herein when the hammer is operating as specified.

G. Rated Hammer Energy:

1. For diesel hammers, the product of the maximum rated stroke times the ram weight. Units: kip-foot.

2. For air hammers, the product of the maximum rated equivalent stroke times the ram weight. Units: kip-foot.

3. For hydraulic hammers, the product of the maximum rated equivalent stroke times the ram weight. Units: kip-foot.

H. 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.

I. Set: Pile penetration in inches per blow.

J. 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.

K. Transferred Hammer Energy: The energy transferred to the pile head at impact from the driving train as determined from measurements using PDA.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be stored out of contact with the ground in such manner and location as shall minimize contamination and deterioration.

1.7 RECORDS

A. A complete set of pile installation records shall be kept by Contractor and shall be made readily available to Engineer. Records shall be kept of the following items: Driving, Drilling, and Installation. (For detailed requirements see the pertinent Articles).

B. Records shall be signed by Engineer only to indicate concurrence with data presented and not as an indication of approval. Two copies of records for the pile shall be forwarded immediately to Engineer following installation.

1.8 SUBMITTALS

A. Submit a detailed description on the proposed driving, and drilling equipment. In addition, a detailed procedure shall be submitted on the proposed pile installation including driving. During the bid period, Department shall provide the soil investigation report of Project Site for use by Contractor in the selection of suitable equipment and procedures to install the piles.

B. Description of the pile installation equipment and pile installation procedure shall be submitted to Engineer for review before commencing pile installation. The pile work plan shall include results of Wave Equation of Pile (WEAP) analysis required to determine the applicable stresses induced on the steel pipe piles during driving and as performed by an engineer registered in State of California.

C. Submit certified test reports for the structural steel base metal mill certifications, welding procedures and procedures qualification records, current welder performance qualification records, non-destructive weld tests and Charpy tests used for pile fabrication.

D. Submit shop drawings including shop and field fabrication details, lifting pad eyes, connections, welding and other necessary information for the fabrication and installation of the pile.

E. Submit calculations for the lifting and installing of prefabricated sections. Calculations shall be signed by Engineer registered in the proper discipline for Work in State of California.

F. Fabricator's quality control procedures and as indicated in Quality Assurance Article. At time of bid, submit completed Fabricator List in Appendix "I" in conformance with Quality Assurance Article Paragraph D. Failure to submit completed Fabricator List in Appendix "I" shall be cause to deem bid nonresponsive.

G. Mill certificates of compliance for steel used in pipe piles.

H. Submit pile-driving records within 24 hours after each pile is driven.

I. Procedure for cleaning the inside of piles before concrete for concrete plug is placed.

J. 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 of experience on waterfront projects and shall be furnished by Contractor to Engineer.

1.9 QUALITY ASSURANCE

A. Engage an independent testing and inspection company to inspect and test shop and field fabrication procedures and welding and submit test reports to Engineer for review. Type and frequency of test on welding shall be in conformance with STRUCTURAL WELDING Section and as specified n this Section.

B. Department shall have the option to perform independent quality assurance (QA) reviews at Contractor’s fabrication facility and field fabrication at Project Site. Provide Department’s QA review personnel with necessary access at the fabrication facility.

C. Installer Qualifications: A qualified installer who has a minimum of 10 years of pile installation experience similar to Project.

D. Fabricator Qualifications: A qualified fabricator shall be one of the following:

1. An approved fabricator by the City of Los Angeles Department of Building and Safety (LADBS).

2. Participate in American Institute of Steel Contruction (AISC) Quality Management Systems (QMS) Certification and is currently designated as a Certified Fabricator through AISC's Certification Program.

3. Possess an API Monogram License for API Spec 5L.

E. Shop-Painting and Field Touch-Up: Conforming to procedure established in HIGH-PERFORMANCE COATINGS Section.

F. Welding: Qualify welding and welders in conformance with AWS D1.1/D1.1M.

PART 2 - PRODUCTS

2.1 MATERIALS

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.

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. Steel Pipe Piles shall be round steel pipe, outside diameter and minimum wall thickness shall be per Drawings and shall be fabricated from rolled plates. Pipe piles shall be manufactured to meet the requirements of API Spec 5L, PSL 2, X52N, or fabricated from ASTM A572/A572M, Grade 50 plate and rolled in conformance with AWWA C200. Piles shall be fabricated from specified plate, and do not use coil products. Yield to tensile strength ratio of base metal shall not exceed 0.85.

C. Concrete for plug shall be in conformance with CONCRETE WHARF CONSTRUCTION Section.

D. Hydrostatic testing is not required.

2.2 STAYLATH MATERIAL

A. 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 WELDING

A. Welding and nondestructive testing shall comply in conformance with the STRUCTURAL WELDING Section.

B. Use longitudinal straight seam welds to fuse rolled plates together to make the steel pipe piles. Welds for steel pipe piles fabrication shall be complete joint penetration (CJP) groove welds. Welding procedures shall be qualified for notch toughness, CVN tests shall be conducted at the weld metal centerline and heat affected zones. Acceptance criteria: 25 ft-lbs at 32 degrees Fahrenheit (F).

C. Pipe pile groove welds shall be 100 percent visually examined by Contractor's Certified Welding Inspector. Groove welds shall be 100 percent radiographically or ultrasonically examined. Fillet welds shall receive 100 percent magnetic particle examination. Acceptance criteria: AWS D1.1/D1.1M , Cause 10.

2.4 SPLICING

A. The length of pipe piles may be built up in sections either before or during installation operations. The connections shall be CJP groove welded and nondestructively examined in conformance with STRUCTURAL WELDING Section. Care shall be taken to properly align the sections connected so that the axis of the pipe shall be straight. The number of welded connections in the length of pile shall be as few as possible.

B. Welds shall be visually and nondestructively examined, as specified in paragraph 2.2C.

2.5 CORROSION CONTROL

A. Paint piles in conformance with HIGH-PERFORMANCE COATINGS Section. Install cathodic protection in conformance with CATHODIC PROTECTION Section.

PART 3 - EXECUTION

3.1 GENERAL

A. Drawings show a driven pile; however, it is anticipated that driving and drilling may be required to achieve the design tip elevation.

B. The minimum penetration for the pile shall be as shown on Drawings.

C. Pile installation procedures should account for pile type, size and length, soil profile and characteristics, hammer characteristics, cushion characteristics and allowable internal pile stresses.

3.2 PILE DRIVING

A. Pile Driving Equipment:

1. Pile driving equipment shall be in good operating condition when brought to Project Site and shall be consistent with that described in the proposal.

    a. Sufficient spare parts shall be mobilized to Project Site to ensure a continuing operation.

    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 feet length. Leads shall be easily adjustable to permit axial driving without interruption if piles deviate from required alignment.

        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 shall travel. Leads shall maintain the hammer on a line of action which coincides 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.

2. Contractor shall employ the proper equipment and methods required to secure the necessary penetration without damage to the piles.

3. Hammer Guides:

    a. Hammer guides to be used shall be suitable for the size of pile and shall hold the hammer properly in line with the pile.

b. The impact hammers may be steam or diesel, single acting and hydraulic. Hammers shall be maintained in operating condition and operated at the rated speed given by the hammer manufacturer. If vibratory hammer is used, last 30 feet of the piles shall be driven using impact hammer. Refer to Mitigation Measures, Monitoring, and Reporting Program, Appendix "G" of Specifications, Measure MM BIO-3, for additional requirements for hammers.

c. Cushion Block Materials:

1) Cushion block shall be micarta and aluminum. Other cushion block material shall be subject to Engineer’s approval. The cushion material shall be selected for expected drivability and compatibility with the pile driving hammers to be used.

d. Hammer Size:

1) Hammer size shall be chosen to be consistent with the size. Contractor shall perform Wave Equation Analysis of Pile (WEAP) pile-drivability analysis to select the appropriate equipment. WEAP analysis shall be performed by a professional engineer holding a currently valid Certificate registration in the State of California with a minimum of 5 years of experience in performing such analysis.

2) The maximum rated energy for impact hammers shall not be less than the value:

Pile Diameter (inches)	Maximum Rated Energy for Diesel or Steam Hammer (ft-kips/blow)	Maximum Rated Energy for Hydraulic Hammer (ft-kips/blow)
<=48	180	100

B. Dynamic monitoring:

1. Continuous Pile Driving Analyzer (PDA) measurements shall be made from beginning of installation in the first production pile of the following structures: Platform (Total Four): A total of 4 PDA measurements (1 per platform).

2. PDA monitoring data shall demonstrate that hammer delivers the energy required to drive the pile and driving stresses are maintained within the limits as indicated in Wave Equation Analysis.

3. The cost for performing the dynamic monitoring shall be at sole cost and expense of Contractor.

4. PDA report documenting the monitoring data shall be submitted to Engineer within 24 hours after completion of PDA monitoring. Minimum 48 hours shall be given to Engineer for review and developing pile driving criteria for other production piles. Additional piles shall not be driven until PDA monitoring data has been accepted by Engineer.

5. Pile driving equipment and pile driving operation used in the installation of the production piles shall be the same as those used in PDA measurement. If new pile driving equipment or driving operation method is proposed, additional PDA monitoring shall be performed at each structure at no additional cost and schedule change.

C. Pile Driving Requirements:

1. Minimum Penetration:

a. Piles shall be driven to design pile tip elevation as indicated on Drawings or deeper to achieve the design capacity as determined by Engineer.

b. If design capacity is not achieved at the design tip, the pile shall be allowed to set up for at least 24 hours. After the set-up time, the pile shall be restruck for 3 inches or 15 blows using a warm hammer. If the pile does not show adequate capacity, it shall be driven until design capacity, as determined by Engineer, is achieved.

c. If the minimum penetration cannot be achieved by driving alone, the soil plug may be removed by drilling inside the piles. To minimize disturbances of the soil outside the piles, drilling shall not be permitted below the pile tip during installation and not within 10 feet above the final pile tip elevation. In the sequence of driving and drilling inside, driving shall be the final step.

d. If drilling is used to facilitate pile driving, a concrete plug of minimum 25 feet length should be installed inside the pile above the soil plug. The total length of soil and concrete plug should not be less than 40 feet. Concrete should not be permitted to fall from height greater than 5 feet during construction of the plug.

e. The water level inside the pile should not be allowed to be deeper than 5 feet from the outside water level during pile installation.

2. Pile Damage:

a. In the event that pile is damaged during handling or driving, the pile shall be pulled and re-driven or replaced as directed by Engineer. The cost of the correction shall be at sole cost and expense of Contractor.

3. Cushion Blocks:

a. Before commencement of driving, the cushion block shall be inspected, and replaced if required, to ensure that the pile can be driven to specified penetration without any interruptions caused by failure of the cushion.

D. Installation Tolerances

1. The pile at the cut-off point shall not deviate in any direction by more than 4 inches horizontally from the locations shown on Drawings. In the final installed position, the pile shall be within 0.5 degrees of its specified slope.

2. After driving is completed, the pile shall not be pulled into alignment.

3. The pile which does not meet the above tolerances may be accepted, provided that the structure is modified as directed by Engineer.

E. Pile-Cut-Off and Extra Pile Length:

1. Provide extra length at top of driven pile section to allow for cut-off of damaged portion and preparation for welding, and for additional driving.

2. After piles are driven, tip of piling shall be cut-off as smooth as possible at the required elevation and at slopes as shown on Drawings.

F. Driving Records:

1. Contractor shall keep a complete driving record for each pile. The following information shall be included:

   a. Date and time of driving

   b. Structure and pile identification, including pile size

   c. Penetration of pile under its own weight

   d. Penetration of pile under the weight of the hammer

   e. Complete hammer data, including stroke length and blows per minute at specified pressure.

   f. Cushion block information

   g. Length of pile taken into the leads

   h. Tip elevation when driving is completed

   i. Cut-off elevation

   j. Seabed elevation

   k. Number of blows per foot for the entire length of driving, recorded in 1-foot intervals

   l. Unusual behavior of hammer or pile during driving

   m. Interruptions in driving, including "set-up" time

   n. Lapsed time for driving each section

   o. Elevations of soil plug after driving

G. Soil Plug Removal:

1. Contractor shall supply equipment, materials and experienced personnel required to remove soil plug from piles. Equipment shall be in good operation condition. Spoils from removal shall be disposed of offsite and off Department property by Contractor in conformance with local, state, and federal requirements. The inside surface of steel pipe piles shall be thoroughly cleaned before the concrete plug is placed.

3.3 DRILLING

A. Drilling Equipment and Personnel:

1. Contractor shall supply equipment, materials, and experienced personnel required to drill soil plug from piles. Equipment shall be kept in good operating condition.

a. Drill Rig:

1) Drill rig can be a rotary type, power swivel, or turbo drill.

b. Support Equipment:

1) Support equipment shall include drill pipe, pup joints, crossover subs, drill collars or bumper subs, stabilizer, drill bits, pumps, and air lift equipment.

c. Personnel:

1) Experienced drifters and roughnecks shall be supplied by Contractor for each shift to do drilling and handle equipment. One drilling supervisor shall be supplied for overall control of drilling procedures.

d. Removal of Soil Plug:

1) The soil plug can be removed from a pile using a bit with a diameter slightly less than the inside diameter of the smallest pile stabbing tip. Drilling to remove a soil plug should stop a minimum of 10 feet above the pile tip.

e. Drilling Fluid:

1) Seawater with air assist can be used as drilling fluid to remove drill cuttings.

2) Drilling and supply should be adequate to maintain a continuous and speedy drilling operation.

3.4 PLACING STAYLATH

A. Immediately prior to placing staylath, perform surveys of the pile head location and elevation. 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.

3.5 OBSTRUCTIONS

A. Potential obstructions include smaller and larger rip rap rock revetment protection in the vicinity and seafloor of the proposed pile driving locations as well as of old concrete foundation piles and timber fender piles.

B. Contractor shall conduct an underwater investigation to field verify the presence of any other obstructions along the seafloor.

C. Relocate or move rip-rap rock or other obstructions located in revetment area and on the seafloor which prevent locating or driving the piles. Care shall be taken to protect stability of slope, existing seawall and backland.

D. Where obstructions are encountered less than 5 feet below the ground surface that result in a sudden, unexpected increase in penetration resistance and deviation from the specified tolerances, perform one or more of the following actions:

1. Remove the obstruction and redrive. Care shall be taken to protect stability of slope and backland.

2. Extract, inspect, reposition, and redrive the pile.

3.6 CONTAINMENT BOOMS

A. Contractor shall deploy containment booms in the area of pile installation Work as directed by Engineer. Contractor shall maintain booms and shall have boat and personnel to maintain booms for 24 hours per day when boom is deployed. Containment boom and absorbent material spill kits shall be readily available on the barge continually. Skimmers shall be readily available. Containment booms shall be of sufficient length to enclose work area including pile driving equipment and crane boom. Spill kit absorbent materials, including but not limited to pads and soft booms, shall be "oil only", polypropylene, or other recyclable materials. The cleanup and disposal of the spilled petroleum product shall be in conformance with ENVIRONMENTAL CONSTRUCTION REQUIREMENTS Section.

3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Contractor shall provide 1 inspection of the submerged and above portions of the recently installed steel pipe piles to check for the following problems:

    a. Structural and other damage to the steel pipe pile

    b. Damage to the steel pipe pile coating

2. Contractor shall provide Engineer and inspection report summarizing findings. The inspection report shall include but not limited to pictures:

    a. Base of driven steel pipe piles showing the riprap and/or armor rock has been properly replaced.

    b. Above water portion of areas of steel pipe piles.

    c. Submerged portion of areas of steel pipe piles.

3. Contractor shall cooperate in every manner to ensure diver safety.

4. Cost of additional inspection(s) require to document the pile repairs have been performed, shall be at sole cost and expense of Contractor.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cold crack filler

B. Hot crack seal

1.2 RELATED SECTIONS

A. Section 32 12 17 - Asphalt Concrete Paving

B. Section 32 17 23 - Pavement Markings

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. The quantity of crack filler shall be measured based on linear feet of material applied to clean cracks. Quantity(ies) shall be paid for under the Lump Sum Construction bid item of Bid Proposal Line Items at the unit price per linear foot in place.

2. Crack filler applied in preparation for pavement fabric shall be paid under the Lump Sum Construction bid item of Bid Proposal Line Items. Refer to ASPHALT CONCRETE PAVING Section.

3. The quantity of crack seal shall be measured based on linear feet of material applied to clean cracks. Quantity(ies) shall be paid under the Lump Sum Construction bid item of Bid Proposal Line Items at the unit price per linear foot in place.

4. Other Work described in this Section shall be considered incidental. The cost of such incidental Work shall be considered to be included in the appropriate bid items and no additional or separate compensation shall be made.

1.4 REFERENCES

A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ASTM D2172/D2172M - Standard Test Methods for Quantitative Extraction of Asphalt Binder from Asphalt Mixtures.

C. ASTM D3910 - Standard Practices for Design, Testing, and Construction of Slurry Seal.

D. ASTM D6307 - Standard Test Method for Asphalt Content of Asphalt Mixture by Ignition Method.

E. Reference Specifications (RS):

Section 200 - Rock Materials

Section 203 - Bituminous Materials

Section 302 - Roadway Surfacing

1.5 SUBMITTALS

A. Submit emulsion-aggregate slurry mix design in conformance with RS Subsection 203-4.2, including aggregate gradation, asphalt emulsion content, water, and additives. Obtain Engineer's approval of mix design prior to application.

1. Resubmit mix design for aggregate source change.

B. Submit test results for emulsion content and moisture content conforming to ASTM D2172/D2172M or ASTM D6307. Submit results for Consistency Test and Wet Track Abrasion Test in conformance with ASTM D3910.

1. Submit results of tests required in RS Table 203-1.7.1 for percentage wear 500 revolutions, sand equivalent, and sulfate soundness.

C. Submit slurry spreading schedule indicating closure periods for each area shown on Drawings to be slurried.

D. Submit certification of calibration for gages used to calibrate mixing units.

E. Submit certificate of calibration of mixing unit metering devices where certification is allowed by Engineer in lieu of Project Site calibration.

F. Submit proposed area(s) within slurry application limits shown on Drawings to place slurry test strips for approval prior to production slurry application.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Emulsion-aggregate slurry shall conform to RS Subsection 203-4.3.

1. Emulsion shall be cationic emulsified asphalt quick set, CQS-1h, in conformance with RS Subsection 203-3.4.3.

2. Aggregate gradation shall conform to RS Table 203-1.7.2: Type I.

3. Slurry Stockpile Tolerances: Production Slurry Stockpile Tolerances Table establish a mix design control band which applies to Contractor's approved mix design submittal.

Production Slurry Stockpile Tolerances	
Sieve Size	Stockpile Tolerance
3/8	
4	5%
8	5%
16	5%
30	5%
50	4%
100	3%
200	2%

   a. Production slurry tolerance percentage values for each sieve may be added to or deducted from the approved mix design percentage passing values for each sieve. The resulting values still apply if they result in a Project aggregate gradation control band outside of the aggregate gradation band in RS Table 203-1.7.2, Type I.

   b. Production slurry aggregate gradations shall not deviate from the approved mix design more than the tolerances shown in Production Slurry Stockpile Tolerances Table.

B. Cold crack filler shall be polymer modified petroleum emulsion, CRF crack filler as distributed by Crafco, (800) 762-3748.

C. Hot crack seal shall be petroleum-based product suited to areas with slow moving traffic and with high resistance to tracking, Parking Lot Sealant as manufactured by Crafco, (800) 762-3748.

D. Herbicide shall be Monsanto Roundup Ultra Max.

PART 3 – EXECUTION

3.1 PREPARATION – WEED REMOVAL

A. Remove vegetation and apply herbicide to weed-infested cracks in conformance with manufacturer's written instructions where weed removal is shown on Drawings. Do not apply when rain is forecast to occur within 24 hours. Remove remaining dead weeds in conformance with manufacturer's written instructions.

3.2 PREPARATION – CRACK FILLING AND SEALING

A. Crack Cleaning:

1. Crack sealing alone or crack sealing prior to slurry seal: Clean cracks to a minimum 1/2 inch depth for crack widths greater than or equal to 1/4 inch for cold pour crack filler and 1/8 inch for hot pour crack sealant.

2. Crack sealing prior to pavement fabric: Clean cracks to a minimum 1/2 inch depth for crack widths greater than or equal to 1/8 inch for hot pour crack sealants.

3. Make minimum of 2 passes with compressed air wand at 90 pounds per square inch (psi) or greater no less than 2 inches from each crack.

3.3 INSTALLATION - GENERAL

A. Do not place crack seal if fog or rain is forecast.

3.4 CRACK FILLING AND SEALING

A. Fill cracks in pavement where required on Drawings or as directed by Engineer.

1. Apply cold pour crack filler to cracks greater than or equal to 1/4 inch in width.

2. Apply hot pour crack seal to cracks greater than or equal to 1/8 inch in width.

a. Overfill cracks with hot pour crack filler and level off to create a neat overband extending approximately 1 inch by 1/8 inch deep on each side of crack or joint.

3.5 CURING

A. Slurried areas shall be allowed to cure in conformance with RS Subsection 302-4.8.

1. Exception: 5 Calendar Days shall be allowed prior to opening to traffic.

B. Allow curing time prior to application of pavement markings in conformance with PAVEMENT MARKINGS Section.

3.6 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Slurry Seal: Engineer shall perform sieve analysis of aggregates in conformance with ASTM C136/C136M and field sampling of slurry in conformance with RS Subsection 302-4.10, except that Engineer shall make determination of emulsion and moisture contents by ASTM D6307 Ignition Method instead of Extraction Test.

a. Slurry failing to meet RS Subsection 302-4.10 sampling test requirements shall be replaced or corrected to conform to the requirements of this Section as determined by Engineer.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cold mill asphalt paving.

1.2 RELATED SECTIONS

A. Section 02 00 01 - Basic Site Materials and Methods

B. Section 32 12 17 - Asphalt Concrete Paving

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 bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. Reference Specifications (RS):

Section 404 - Cold Milling

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

A. Steel fence post stubs, steel guard post stubs, concrete footings with steel reinforcement, steel wheel stop pins, and other existing substructures capable of damaging cold milling equipment may be present in existing asphalt concrete grade to be cold milled.

1. Perform visual inspection of area to be cold milled prior to start of operations.

2. Locate buried items by sweeping entire area with metal detector. Coordinate with Engineer to witness and approve metal detector inspections.

3. Mark and protect in place substructures to remain. Remove interfering steel items as directed by Engineer or as shown on Drawings.

3.2 EQUIPMENT

A. Milling equipment shall conform to RS Subsection 404-2 and shall be capable of the following:

1. Cutting a tapered cross-slope.

2. Cutting to daylight while maintaining design profile.

B. Milling equipment shall include a dust suppression system that meets South Coast Air Quality Management District (SCAQMD) regulations.

C. Do not use unequally worn cutting teeth that produce an uneven milling pattern.

3.3 CONSTRUCTION

A. Perform pavement cold milling in conformance with RS Subsection 404-1 except for RS Subsections 404-11 and 404-12.

B. Grade milled surface such that a 10 foot straight edge laid in any direction at any location reveals less than a 1/2 inch variation.

C. Cold milling shall not gouge or otherwise damage remaining underlying pavement beyond depths exceeding cutting drum pattern.

D. Where the pavement to be resurfaced joins existing pavement, cold milled areas shall terminate with a 2-inch minimum depth vertical shoulder or 3 inch shoulder cut for existing Class W asphalt concrete. Cut shoulder along join lines to provide a butt join unless shown otherwise on Drawings or directed otherwise by Engineer.

3.4 REPAIRS

A. Notify Engineer of areas where visible cracks remain in existing asphalt after cold milling. Perform additional cold milling of cracked areas as directed by Engineer.

3.5 CLEANING

A. Mechanically sweep cold milled areas throughout the course of milling operations in conformance with RS Subsection 404-7.

B. Leave areas clean of cuttings at the end of each working day.

C. Cuttings shall become property of Contractor and be disposed of off Department property.

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 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. 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 Project 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 31 23 33 - Trenching and Backfilling

B. Section 32 01 13.61 - Slurry Seal

C. Section 32 01 16.71 - Cold Milling Asphalt Paving

D. Section 32 11 24 - Crushed Miscellaneous Base

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 203-6 - Asphalt Concrete

Section 302 - Roadway Surfacing

Subsection 302-5 - Asphalt Concrete Pavement

1.5 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.

1.6 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.

1.7 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.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Tack coat shall conform to RS Subsection 203-1, PG 70-10.

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 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. Cold mill prior to overlay where required by Drawings and in conformance with COLD MILLING ASPHALT PAVING Section.

C. 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.

D. 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.

E. 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.

F. 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.

G. Do not place asphalt concrete until Engineer approves batch plant gradation samples.

H. 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.

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
4. Reinforcement bars
5. Catch basins
6. Cast-in-place vaults
7. Sidewalks
8. Fence footings
9. Sign post footings
10. Guard post footings
11. Concrete pads for electrical and mechanical equipment
12. Maintenance holes
13. Site furnishing footings

B. Slurry: Duct bank encasement.

C. Underwater Concrete: Tremie concrete.

D. Other non-wharf and non-building concrete structures as shown on Drawings.

1.2 RELATED SECTIONS

A. Section 05 50 01 - Guard Posts

B. Section 26 00 01 - Basic Electrical Materials and Methods

C. Section 31 00 00 - Earthwork

D. Section 32 31 13 - Chain Link Fences and Gates

E. Section 33 10 01 - Water Distribution

F. Section 33 30 00 - Sanitary Sewerage

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 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 C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

J. ASTM C88/C88M - Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.

K. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

L. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

M. ASTM C150/C150M - Standard Specification for Portland Cement.

N. ASTM C470/C470M - Standard Specification for Molds for Forming Concrete Test Cylinders Vertically.

O. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

P. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

Q. 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.

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, 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.

1.6 QUALITY ASSURANCE

A. Department Testing Laboratory (Test Lab) shall perform tests in conformance with RS Subsection 201-1.1.7.

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.

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. 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 201-1.1.7.

    a. Coordinate with Test Lab through Engineer to perform additional, earlier cylinder breaks for purposes of scheduling.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store fly ash separately from other components of concrete until concrete is ready to be batched.

PART 2 – PRODUCTS

2.1 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/A706Mand t:

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. Headed steel anchors shall be by Nelson Stud Welders.

F. 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 201-1.3.3, or elsewhere in Specifications.

G. Fine aggregate shall conform to RS Subsection 200-1.5.

H. 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.

I. Chemical admixtures shall conform to RS Subsection 201-1.2.6

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.

J. Fly ash shall conform to RS Subsection, 201-1.2.7.3, Class F and ASTM C618.

K. 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.

L. Concrete curing shall be by water or membrane curing, Type 1-D, in conformance with RS Subsection 201-4.

M. Sealants for expansion and control joints shall be as specified on Drawings. Joint fillers shall conform to RS Subsection 201-3.2.

N. Epoxy adhesives shall be 2-component, 100 percent solids, 100 percent reactive suitable for use on dry or damp surfaces.

O. 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://www.ladbs.org/docs/default-source/forms/green-building-2023/grn_2_voc_content_verification_checklist-01.17.23.pdf?sfvrsn=19f4c153_10

P. Slurry material shall be as specified in BASIC SITE MATERIALS AND METHODS Section.

2.2 CONCRETE MIX DESIGN

A. Mix shall be designed to produce a concrete that has maximum density, minimum shrinkage, and maximum smoothness of surface.

B. Concrete mix designs shall conform to RS Subsection 201-1.3.3 where concrete class is shown on Drawings. Concrete mix design shall conform to RS Subsection 201-1.3.4 where compressive strength is shown on Drawings.

C. 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.

2.3 TREMIE MIX DESIGN

A. Concrete shall have a minimum 28 day compressive strength of 4,000 psi. The 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/pozzolan or cement/fly ash content of 752 pounds per cubic yard, the weight of each shall be: cement 640 pounds, fly ash 112 pounds. Fly ash shall be Class F, conforming to RS Subsection 201-1.2.7.3. Contractor shall increase the cementitious material content as required to meet strength requirements.

B. Aggregate shall weigh at least 140 pounds per cubic foot based on the minimum density of solid material in an oven-dry condition. Maximum size of aggregate permitted in the concrete plug shall be grading D in conformance with RS Subsection 201-1.4.2 (3/8 inch maximum). Aggregates shall be small and rounded, the sand content shall be 45 percent or greater. Aggregates and sand shall be in conformance with ASTM C33/C33M.

C. Water to cementitious materials ratio shall not exceed 0.44 including combined water in the aggregate.

D. The workability as measured by the slump test shall be 7 to 9 inches. To obtain the properties required for proper placement, a suitable water-reducing and plasticizing admixture may be necessary.

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 and high mast light pole foundation 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. 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.

E. 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 TREMIE CONCRETE PLACEMENT

A. Tremie concrete shall be deposited under water. Tremie Work shall conform to RS Subsection 303-1.8.9 and this Article.

B. For placing tremie concrete, use a tremie pipe 6 to 10 inches in diameter, fitted with a suitable end sealing device. Provide the tremie pipe with a suitable sized funnel or hopper to facilitate transfer of sufficient concrete from the delivery device to the tremie pipe. Do not use aluminum tremies for pumping or placing concrete.

C. Place or pump the tremie concrete through the pipe, starting at the lowest point possible. The flow of concrete or grout may be induced by slightly raising the discharge end, always keeping it in the deposited concrete a sufficient distance to displace water without mixing or segregation. Eject the concrete from the lower end of the pipe, always discharging into fresh concrete.

D. Concrete with aggregates 3/8 inch or less may be placed by direct pumping. Because of the long drop down the pipe and the possibility of a vacuum forming with subsequent clogging, an air vent should be provided in the pipe near the water surface.

E. To start placement, the pipe shall have a steel plate closure with soft rubber gaskets in order to exclude water from the pipe. Take care to prevent unbalanced fluid heads and a sudden discharge of concrete.

F. Concrete placement shall be as continuous as possible.

3.5 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.

3.6 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.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Steel roll gate system.

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 this Work of this Section shall be paid under the Lump Sum Construction bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.

B. ASTM D523 - Standard Test Method for Specular Gloss.

C. ASTM D714 - Standard Test Method for Evaluating Degree of Blistering of Paints.

D. ASTM D822/D822M - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

E. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

F. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.

G. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

H. ASTM D3359 - Standard Test Methods for Rating Adhesion by Tape Test.

1.5 SUBMITTALS

A. The manufacturer’s submittal package shall be provided prior to installation.

B. The manufacturer shall supply a total roll gate system of Ameristar® PassPort II® Industrial Ornamental design series and Classic style. The system shall include components (i.e., pickets, rails, gate uprights, wheels, and hardware) required.

1.6 QUALITY ASSURANCE

A. Provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt at Project Site, materials shall be checked to ensure that no damages 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 - MATERIALS

2.1 MANUFACTURER

A. The steel roll gate system shall conform to Ameristar PassPort II Industrial Ornamental design series, Classic style and 3-rail frame configuration with a gate height of 8 feet manufactured by Ameristar Fence Products, Inc. in Tulsa, Oklahoma. Website: www.ameristarperimeter.com.

2.2 MATERIAL

A. Steel material for roll gate components (i.e. pickets, rails, diagonals and uprights), shall be commercial steel with a minimum yield strength of 45,000 psi.

B. Ornamental picket material shall be 1” square x 14 Ga. Tubing. Picket spacing shall be 4-3/4”. Material for toprails, uprights and diagonals rails shall be 2” square x 12 Ga. Material for the bottom rail shall be 2” x 4” x 11 Ga. Posts shall be a minimum of 4” square x 11 Ga.

2.3 FABRICATION

A. Pickets/pales, rails, uprights, and posts shall be precut to specified lengths. Diagonals shall be precut to specified lengths and angles. Frame materials shall be joined by welding. Pickets/pales shall be face welded to roll gate frame, except for Invincible or Gauntlet style gates over 18’ long. Invincible or Gauntlet style gates over 18’ long shall have pickets face-welded to 2” x 2” angle iron to form panels equal in length to the gate frame bay width.

B. The manufactured roll gates and bolt-on panels (if applicable) shall be subjected to the PermaCoat® thermal stratification coating process (high-temperature, in-line, multi-stage, multi-layer) including, as a minimum, a six-stage pre-treatment/wash (with zinc phosphate), an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a polyester finish. The base coat shall be a thermosetting epoxy powder coating (gray in color) with a minimum thickness of 2 mils. The topcoat shall be a “no-mar” TGIC polyester powder coat finish with a minimum thickness of 2 mils. The color shall be (specify Black, Bronze, White, or Desert Sand). The stratification-coated framework shall be capable of meeting the performance requirements for each quality characteristic shown in Specifications.

C. Completed gates shall be capable of supporting a 200 lb. load applied at midspan without permanent deformation.

PART 3 - EXECUTION

3.1 PREPARATION

A. New installation shall be laid out by Contractor in accordance with Drawings.

3.2 INSTALLATION

A. Gateposts shall be set in accordance with the spacing's shown in Drawings. EARTHWORK and CONCRETE FOR EXTERIOR IMPROVEMENTS sections of Specification shall govern post base material requirements. 6" wheels shall be bolted to the gate (between the wheel plates welded near the ends of the gate bottom rail). The gate shall be set upright with the V-grooved wheels positioned over the pre-installed steel V-track that traverses the gate opening. V-track is to be installed level to prevent gravity from causing the gate to roll freely. Roller guides shall be affixed to the gateposts at a height even with the gate top rail to hold the gate in a vertical position. Gate stop options shall either be welded to the top end of the gate and guideposts, track, or separate post set at each end of the gate in the full open or closed position, so gate cannot pass rollers in either direction.

3.3 CLEANING

A. Contractor shall clean Project Site of excess materials; post hole excavations shall be scattered uniformly away from posts.

Table 1 – Coating Performance Requirements		
Quality Characteristics	ASTM Test Method	Performance Requirements
Adhesion	ASTM D3359	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	ASTM B117 ASTM D714 ASTM D1654	Corrosion Resistance over 1,000 hours (Scribed per D1654; failure mode is accumulation of 1/8” coating loss from scribe or medium #8 blisters).
Impact Resistance	ASTM D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625” ball).
Weathering Resistance	ASTM D822/D822M ASTM D2244 ASTM D523	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Chain link fences, gates, and accessories

B. Post footings

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 Lump Sum Construction bid item 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 A121 - Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.

E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

G. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.

H. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

I. ASTM A824 - Standard Specification for Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link Fence.

J. ASTM F626 - Standard Specification for Fence Fittings.

K. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.

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.

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, except barbed wire, 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 plus 1 foot high (vertically), 45 degree barbed wire extension unless called out otherwise on Drawings.

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. 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).

D. 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).

E. 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).

F. 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).

G. 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.

H. 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.

I. 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).

J. 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.

K. 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.

L. 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).

M. 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).

N. 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).

O. 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).

P. 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).

Q. 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).

R. Rail, Brace Ends, and Post Caps for Attaching Barbed Wire Extension Arm:

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).

S. 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.

2.2 CONCRETE FOR SETTING POSTS

A. Concrete for setting posts shall be in conformance with Concrete For Exterior Improvements Section.

2.3 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
E.	Top rail and braces	1-5/8	1.66	2.27
F.	Swinging and sliding gate post for 3 feet, and 6 feet single or 12 feet double gates, 6 feet or higher; Under 72 inches	3 2-1/2	2.875 2.375	5.79 3.65
G.	Swinging and sliding 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	6-5/8	6.625	18.99

	Use	Nominal Pipe Size* O.D. (Inches)	Actual O.D. (Inches)	Weight per Lbs/ft (Galv. Steel)
	single gates 13 to 18 feet and double gates 26 to 36 feet			
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
	Vertical Divisions---	2	1.90	2.72
	Bracing---	1-5/8	1.66	2.27
*Fence Industry Standard O.D.				

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, where intermediate vertical or barbed wire extensions are required, 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. Gates to be used with fencing having barbed wire extension arms shall have vertical members extended to carry the barbed wire across the gates. Barbed wires shall be in a vertical plane, above the gates, on approximately 4 inch centers. The top wire shall be approximately 12 inches above the top of the gate.

H. Rolling gates shall be equipped as follows:

1. Upper gate guides and track of Schedule 40 steel pipe.

2. Trolley wheels for track of malleable cast iron with hardened steel axles and permanently lubricated steel ball bearings.

3. A steel assembly mounted to the trolley wheel axle that prevents the wheel from lifting off the track.

4. A 2-wheel front carriage with at least 8 inches diameter solid rubber tired wheels.

5. Flared guide brackets.

6. Eye bolt and chain or other locking device.

7. Line posts shall be 5 feet on center in the length that supports the rolling gate.

I. Install safety posts for rolling gates at the terminal post and at approximately 1/3 the gate width measurement back along the fence line. Center safety posts 8 inches inside the fence line and the same dimensions as line posts. The safety posts shall prevent gates from falling if they come off track.

J. 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.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Steel fence system.

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 this Work of this Section shall be paid under the Lump Sum Construction bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.

C. ASTM D523 - Standard Test Method for Specular Gloss.

D. ASTM D714 - Standard Test Method for Evaluating Degree of Blistering of Paints.

E. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

F. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.

G. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

H. ASTM D3359 - Standard Test Methods for Rating Adhesion by Tape Test.

I. ASTM F2408 - Standard Specification for Ornamental Fences Employing Galvanized Steel Tubular Pickets.

1.5 SUBMITTAL

A. The manufacturer's submittal package shall be provided prior to installation.

1.6 QUALITY ASSURANCE

A. Contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt at Project Site, materials shall be checked to ensure that no damages 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.

1.8 WARRANTY

A. Structural fence components (i.e. rails, pickets, and posts) shall be warranted within specified limitations, by the manufacturer for a period of 10 years from date of original purchase. Warranty shall cover any defects in material finish, including cracking, peeling, chipping, blistering or corroding.

B. Reimbursement for labor necessary to restore or replace components that have been found to be defective under the terms of manufactures warranty shall be guaranteed for five (5) years from date of original purchase.

PART 2 - MATERIALS

2.1 MANUFACTURERS

A. The fence system shall conform to Ameristar Aegis II, Classic design, 3-Rail style manufactured by Ameristar Fence Products, Inc. in Tulsa, Oklahoma. Website: www.ameristarperimeter.com.

B. The steel rolling gate shall conform to Ameristar Passport Classic Commercial Roll Gate, 8 foot gate height, manufactured by Ameristar Fence Products, Inc. in Tulsa, Oklahoma. Website: www.ameristarperimeter.com.

2.2 MATERIALS

A. Steel material for fence framework (i.e. tubular pickets, rails and posts), shall be galvanized prior to forming in accordance with the requirements of ASTM A653/A653M, with minimum yield strength of 45,000 psi. The steel shall be hot-dip galvanized to meet the requirements of ASTM A653/A653M with a minimum zinc coating weight of 0.90 oz/ft2 (276 g/m2), Coating Designation G-90.

B. Material for pickets shall be 1” square x 14 Ga. tubing. The cross-sectional shape of the rails shall conform to the manufacturer’s ForeRunner™ double wall design with outside cross-section dimensions of 1.75” square and a minimum thickness of 14 Ga. Picket holes in the ForeRunner rail shall be spaced 4.715” o.c., except for Invincible style 6’ long, which shall be, spaced 4.98” o.c. Picket retaining rods shall be 0.125” diameter galvanized steel. High quality PVC grommets shall be supplied to seal picket-to-rail intersections. Fence posts and gateposts shall meet the minimum size requirements of Drawings.

2.3 FABRICATION

A. Pickets, rails and posts shall be precut to specified lengths. ForeRunner rails shall be prepunched to accept pickets. Pickets shall be predrilled to accept retaining rods.

B. Grommets shall be inserted into the prepunched holes in the rails and pickets shall be inserted through the grommets so that predrilled picket holes align with the internal upper raceway of the ForeRunner rails (Note: This can best be accomplished by making an alignment jig). Retaining rods shall be inserted into each ForeRunner rail so that they pass through the predrilled holes in each picket.

C. The manufactured galvanized framework shall be subjected to the PermaCoat® thermal stratification coating process (high-temperature, in-line, multi-stage, multi-layer) including, as a minimum, a six-stage pretreatment/wash, an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a polyester finish. The base coat shall be a thermosetting epoxy powder coating (gray in color) with a minimum thickness of 2 mils. The topcoat shall be a “no-mar” TGIC polyester powder coat finish with a minimum thickness of 2 mils. The color shall be (specify Black, Bronze, White, or Desert Sand). The stratification-coated framework shall be capable of meeting the performance requirements for each quality characteristic shown in Specifications.

D. Completed sections (i.e., panels) shall be capable of supporting a 600 lb. load applied at midspan without permanent deformation. Panels shall be biasable to a 25 percent change in grade.

E. Swing gates shall be fabricated using 1.75” x 14ga Forerunner double channel rail, 2” sq. x 12ga. gate ends, and 1” sq. x 14ga. pickets. Gates that exceed 6’ in width shall have a 1.75” sq. x 14ga. intermediate upright. Rail and upright intersections shall be joined by welding. Picket and rail intersections shall also be joined by welding. Gusset plates shall be welded at each upright to rail intersection. Cable kits shall be provided for additional trussing for gates leaves over 6’.

F. Pedestrian swing gates shall be self-closing, having a gate leaf no larger than 48” width. Integrated hinge-closer set (2 qty) shall be ADA compliant that shall include a variable speed and final snap adjustment with compact design (no greater than 5” x 6” footprint). Hinge-closer set (2 qty) shall be tested to a minimum of 500,000 cycles and capable of self-closing gates up to a maximum gate weight of 260 lbs. and maximum weight load capacity of 1,500 lbs. Hinge-closer device shall be externally mounted with tamper-resistant security fasteners, with full range of adjustability, horizontal (.5” - 1.375”) and vertical (0 - .5”). Maintenance free hinge-closer set shall be tested to operate in temperatures of negative 20 F to 200 F degrees, and swings to negative 2 degrees to ensure reliable final lock engagement.

PART 3 - EXECUTION

3.1 PREPARATION

A. New installation shall be laid out by Contractor in accordance with Drawings.

3.2 FENCE INSTALLATION

A. Fence post shall be spaced according to manufacturer Specifications, plus or minus ½”. For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade. Fence panels shall be attached to posts with brackets supplied by the manufacturer. Posts shall be set in concrete footers having a minimum depth of 36” (Note: In some cases, local restrictions of freezing weather conditions may require a greater depth). EARTHWORK and CONCRETE FOR EXTERIOR IMPROVEMENTS sections of Specification shall govern material requirements for the concrete footer. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only if shown by engineering analysis to be sufficient in strength for the intended application.

3.3 FENCE INSTALLATION MAINTENANCE

A. When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1-3 above shall negate warranty. Ameristar spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent overspray. Use of non-Ameristar parts or components shall negate the manufactures' warranty.

3.4 GATE INSTALLATION

A. Gate posts shall be spaced according to the manufacturers' gate Drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The manufacturers' gate Drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacture of the gate and shall be installed per manufacturer's recommendations.

3.5 CLEANING

A. Contractor shall clean Project Site of excess materials; post-hole excavations shall be scattered uniformly away from posts.

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 26 00 01 - Basic Electrical Materials and Methods

B. Section 31 23 33 - Trenching and Backfilling

C. Section 33 10 01 - Water Distribution

D. Section 33 30 00 - Sanitary Sewerage

E. 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 Lump Sum Construction Bid Item 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

C. 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 05 50 01 - Guard Posts

B. Section 09 90 01 - Painting for Exterior Improvements

C. Section 09 96 20 - Corrosion Control

D. Section 31 23 33 - Trenching and Backfilling

E. Section 31 50 01 - Excavation Safety Requirements

F. Section 32 12 17 - Asphalt Concrete Paving

G. Section 32 13 14 - Concrete for Exterior Improvements

H. 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 Lump Sum Construction 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: http://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.

1. Pipe 4 inch in diameter and larger shall be Class 52 in conformance with AWWA C151/A21.51, double cement mortar lined in conformance with AWWA C104/A21.4.

2. Pipe ends shall be factory machined or, if field cut, shall be beveled as required.

3. Flanged pipe shall be Class 53 in conformance with AWWA C115/A21.15 unless otherwise called for on Drawings.

4. Furnish pipe in standard lengths.

5. Lining and coating of pipe and fittings shall be in conformance with RS Table 209-1.1.2.

6. Joints for ductile iron pipes and fittings shall be in conformance with RS Table 209-1.1.2.

7. Pipe shall have the letters “U.L.” or “FM” marking in conformance with AWWA C151/A21.51 Section 51-11.

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.

   a. Mechanical joints: Class 350

   b. Ductile iron pipe flanged fittings shall be Class 125 with 250 pounds per square inch (psi) rated pressure. Fittings shall be in conformance with AWWA C104/A21.4. These flanges match those of the Class 125 flanges shown in ASME B16.1 and shall be joined with valve, hydrants, or other fittings having Class 125, ASME B16.1 flanges.

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. Underground valves, 6-inches to 12-inches, shall be NRS, resilient wedge gate valves, Model F-6100, as manufactured by Clow Valve Company, (888) 889-2411. Provide position indicator as indicated on Drawings.

C. Above ground valves for fire suppression water service system shall be OS and Y, resilient wedge gate valves, Model F- 6136, as manufactured by Clow Valve Company.

D. Above ground valves for domestic water system shall be NRS, flanged, resilient wedge gate valves, Model F-6102, as manufactured by Clow Valve Company.

E. 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).

F. Valve box for valve with position indicator shall be cast iron, complete with top, extension, bottom, and drop lid with 1/2-inch skirt, Series 6855, Item 662A, as manufactured by Tyler Pipe, (866) 527-8471.

G. Valve box for fire hydrant control valve shall be cast iron valve box Model A-3009 and valve box cap shall be Model A-29600, as manufactured by Alhambra Foundry Company, (626) 289-4294.

H. Fire hydrant break off spool shall be 6-inch by 6-inch, flanged. Spool shall be delivered without bolt holes in one flange. Bolt holes shall be drilled in the field to facilitate orientation of fire hydrant outlets as indicated on Drawings.

I. Check valves shall be swing type, bronze mounted with bronze faced disc, Kennedy Valve Figure No. 1126.

J. Fire department inlet connections shall be 2 way straight (back outlet) with double clappers, 4 by 2-1/2 inch by 2-1/2 inch female hose inlets, brass pin lug swivel, cast brass body with no lettering, Potter-Roemer Figure No. 5721. Provide each inlet with brass pin lug plug with attached chain, Potter-Roemer Figure No. 5941.

K. Water meters 2 inches to 10 inches shall be Neptune High Performance Turbine, direct reading in cubic feet.

2.4 FIRE HYDRANTS

A. Fire hydrants shall be 2-1/2 inch by 4 inch outlets with caps and chains Model 850, as manufactured by Clow Valve Company. Provide 1-3/4 inch pentagonal nuts on stems and protective caps.

B. Fire hydrant extension shall be ductile iron flanged extension, 6 inch diameter, cement lined and asphalt coated, without break-off groove, complete with 6 sets of bolts and nuts.

2.5 MISCELLANEOUS MATERIALS

A. Solid plug shall be ductile iron and mechanical joint, Series 1261, manufactured by NAPPCO.

B. Adapter shall be ductile iron, NAPPCO Series 1255.

2.6 POSITION INDICATORS

A. Valve position indicators shall be Trumbull planetary gear design sealed with 2 neoprene O-rings installed in a valve box at ground level as manufactured by Trumbull Industries, Inc., (800) 677-1799.

2.7 CORROSION CONTROL

A. Outside surfaces of underground pipe and fittings shall be corrosion protected with 8 mil thick polyethylene tube encasement in conformance with CORROSION CONTROL Section.

B. 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

C. Apply modified aluminum epoxy mastic in conformance with CORROSION CONTROL Section to underground metals not otherwise protected against corrosion.

2.8 RUBBER GASKETS

A. Furnish rubber gaskets and gasket lubricant with rubber gasket joint pipe in sufficient quantity for the amount of pipe ordered.

B. Rubber gaskets for flanged joints shall be full face 1/8 inch thick neoprene rubber and in conformance with AWWA C111/A21.11.

2.9 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.

2.10 WELDED STEEL PIPE CASING

A. Welded steel pipe casing shall be in conformance with ASTM A53/A53M, Grade B, standard weight, minimum yield strength of 36,000 psi with butt weld joints. Pipe thickness shall be capable of withstanding a Cooper E-80 railroad loading. Coat the exterior surface of the pipe casing with a modified aluminum epoxy mastic as specified in CORROSION CONTROL Section.

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. Backfilling shall be in conformance with TRENCHING AND BACKFILLING Section.

F. 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.

G. Install underground utility warning tape as specified in UNDERGROUND UTILITY WARNING TAPE Section.

H. Paint in conformance with PAINTING FOR EXTERIOR IMPROVEMENTS Section.

1. Paint fire hydrants safety yellow.

I. 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 PIPE CASING INSTALLATION

A. Design and construct supports, insulators, and centering devices for the carrier pipe so that no railroad loadings are transmitted to the water pipe.

3.4 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 31 23 33 - Trenching and Backfilling

C. 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 Lump Sum Construction 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 207-17 - PVC Gravity Pipe

Section 306 - Open Trench Conduit Construction

Subsection 306-1 - General

Subsection 306-7.8 - Gravity Pipeline Testing

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sanitary sewer shall be polyvinyl chloride gravity pipe (PVC) in conformance with RS Subsection 207-17.

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 33 - Trenching and Backfilling

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 Lump Sum Construction 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-312-1 - Pavement Remodeling at Catch Basins

S-320-0 - Sidewalk Outlet Structure

S-322-2 - Sidewalk Culvert with Steel Plate Top

S-331-1 - Monolithic Connection

S-341-0 - Catch Basin Reinforcement

S-349-2 - Catch Basin Protection Bar and Support

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. FloGard Flat Grated Inlet. Model No. FPG-24F8. Solids Storage Capacity (cu. ft.): 1.25. Filtered Flow (cu. ft./sec.): 0.85.

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.

J. Filter fabric shall be Mirafi 140N as manufactured by TenCate.

K. NDS 75G 4" atrium grate as manufacturered by NDS, https://www.ndspro.com.

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.

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. Metal Castings and Grates:

1. Set frames, grates, and covers to the finish elevations shown on Drawings.

E. 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. Concrete wharf modifications to accommodate construction of Alternative Marine Power (AMP) boxes.

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

B. Section 31 62 13.23 - Prestressed Concrete Piles

C. Section 33 40 01 - Storm Drainage

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Concrete wharf construction shall be paid under the Lump Sum Construction bid item of Bid Proposal Line Items.

2. Modifications Due to Misaligned Piles (Allowance Item): Staylath, falsework, formwork modifications, reinforcement, and concrete required to accommodate misaligned concrete and steel piles, or as directed by Engineer, shall be paid on a time and material basis provided the misaligned piles were driven in conformance with PRESTRESSED CONCRETE PILES Section and were not due to Contractor error. Additional staylath, falsework, and formwork required due to Contractor error shall be placed at Contractor's sole cost and expense. No Payment shall be made for piles that are less than 24 inches out of alignment.

3. On or about the first of each month, Contractor shall provide an itemized cost statement for Work performed during the prior month under bid items listed above. The statement shall include a summary tabulation and a detailed itemization of changes. Original invoices for services and fees shall be included in the statement.

1.4 REFERENCES

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary.

B. ACI PRC-347 - Guide to Formwork for Concrete.

C. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

E. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.

F. ASTM A970/A970M - Standard Specification for Headed 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 C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.

M. ASTM C150/C150M - Standard Specification for Portland Cement.

N. ASTM C157/C157M - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.

O. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.

P. ASTM C203 - Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.

Q. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

R. ASTM C470/C470M - Standard Specification for Molds for Forming Concrete Test Cylinders Vertically.

S. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.

T. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

U. ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

V. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

W. AWS C6.1 - Recommended Practices for Friction Welding.

X. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars.

Y. 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 207 - Gravity Pipe

Subsection 207-17 - PVC Gravity Pipe

Section 302 - Roadway Surfacing

Subsection 302-6.4 - Finishing

Section 303 - Concrete and Masonry Construction

Subsection 303-1 - Concrete Structures

Z. University of California, San Diego (UCSD), Department of Structural Engineering:

Report TR 98/14 - Seismic Testing of a Full Scale Pile Deck Connection Utilizing Headed Reinforcing, August 1998

1.5 SUBMITTALS

A. Concrete Mix Design:

1. Submit the proposed concrete design mixes to Engineer for review and provide required testing data at least 30 days before scheduled use on Project. Available test data for the proposed mix shall be included with the submittal.

2. Submit certification that the aggregates met the recommendations of ASTM C33/C33M, Appendix XI for reactivity.

3. Submit certification that the aggregates met the soundness requirements of ASTM C33/C33M when tested in conformance with the requirements of ASTM C88/C88M using a sodium sulfate solution.

4. Submit certification that fly ash meets RS Subsection 201-1.2.5.3, Class F.

5. Submit certification on admixtures to be used.

B. Reinforcing Steel:

1. Submit 2 copies of mill test reports certifying that materials meet requirements of ASTM A615/A615M, ASTM A706/A706M, and ASTM A970/A970M.

2. Submit chemical analysis for determining carbon equivalent of reinforcing steel which shall be welded in conformance with AWS D1.4/D1.4M.

3. Before fabricating materials, submit shop drawings to Engineer for review showing bending diagrams, critical dimensions to ends of bars, including complete information for placing steel reinforcing and accessories, amount of concrete cover, and minimum spacing between bars. Do not scale dimensions from Drawings, or use Drawings for shop drawings.

4. Two copies of the reviewed and corrected reinforcing steel shop drawings including the list of the reinforcing steel shall be furnished to Engineer at Project Site before the placing of reinforcing steel is started.

C. Concrete Formwork:

1. Submit shop drawings and complete calculations for concrete formwork, signed by a State of California registered civil engineer in hard copy and electronic file format.

2. Formwork shop drawings shall show surface finish, formwork materials, form ties, falsework, shoring, and incidental materials.

D. Submit a layout of locations with methods of construction joints and marked with unique identification numbers for each pour to Engineer for review prior to commencing fabrication of reinforcement.

E. Submit manufacturer’s certificate attesting that structural metals comply with Specifications. In the case of fabricated metal, certificates shall be supplied by the fabricator attesting that each element of the fabrication including welding electrodes and coatings comply with Specifications.

F. Submit manufacturer’s certificate for each nonmetallic component to be included in Work attesting that materials comply with Specifications.

G. Submit equipment to be used to mechanically roughen surface of existing concrete.

H. Concrete Coring Submittals:

1. Submit methods and equipment proposed for concrete coring.

2. Submit proposed procedures to repair rebar cut during coring Work and to prevent further cutting of reinforcement.

3. Submit description of concrete core locations for Engineer's inspection and review including locations, if any, where reinforcement was cut and how it was repaired.

I. Submit drill and bond dowels materials and methods.

J. Submit concrete removal procedures and exposed steel reinforcing protection method.

K. Crack Repair Report: Epoxy injection materials manufacturer certification that crack repair was performed by a licensed and certified applicator in conformance with manufacturer's written instructions.

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 Department approved laboratory. 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 in this Section 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.

a. Test Lab shall perform the following tests and services:

1) Test fine and coarse aggregate for conformance with RS Subsections 200-1.4 and 200-1.5.3.

2) Review Contractor's proposed mix designs.

3) Perform concrete compressive strength tests.

2. Evaluation of strength tests of trial batches shall conform to RS Subsection 201-1.1.4, 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.

3. 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, concrete mix and reinforcing steel.

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. Provide and maintain facilities for safe storage and curing of concrete test cylinders at Project Site as required by ASTM C31/C31M, standard cure method. Cylinder molds shall conform to ASTM C470/C470M . In addition to test cylinders required by Contractor's testing and quality control, Contractor shall also make for Department 4 concrete test cylinders per 50 cubic yards of concrete up to 150 cubic yards, then 4 test cylinders per 250 cubic yards of concrete poured for each day of Work. A minimum of 4 cylinders shall be made for each day's pour, or upon change of mix design. Upon notification, dispose of any cylinders not tested by Department off Department property.

e. When requested, furnish copies of test reports of shipments of concrete to Engineer and Test Lab.

f. Maintain a complete record of specimens taken, giving detailed location of each pour represented.

g. Label cylinders with the date of sampling, the class and mix proportions of the concrete, and Work location from which the sets of samples were taken based on features shown on Drawings.

h. Test cylinders shall not be transported until 24 hours after they have been cast. Cylinders shall be picked up by Test Lab within 72 hours after casting. Handle cylinders in a manner so as to prevent damage to samples and loss of lids. Failure to comply with the provisions of this Section regarding cylinder handling may be cause for rejection of the concrete for the part of the structure represented by the cylinders. Engineer may further require performance of any and necessary alternative strength tests at sole cost and expense of Contractor if cylinder tests are non-conclusive or cylinders are mishandled.

i. 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.

j. Provide evidence that the casted concrete has met requirements as specified in Materials Article of this Section. Strength shall be determined by cylinder breaks after 28 days as specified by ASTM C39/C39M .

1) Coordinate with Test Lab through Engineer to perform additional, earlier cylinder breaks for purposes of scheduling.

2) If the cylinders show compressive strengths below the minimum acceptable limit, Engineer may require extraction of core samples from the parent concrete structure at Contractor's sole cost and expense. Cores shall conform to ASTM C42 and RS Subsection 201-1.1.5. Cores shall be extracted by Contractor and shall be tested by Test Lab.

B. 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 character of Work in conformance with Specifications.

C. Installers:

1. Personnel installing adhesive anchors and rebar dowels shall be trained and certified in the dowel system installation procedures.

PART 2 - PRODUCTS

2.1 DESIGN OF STRUCTURAL CONCRETE MIX

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 signed by a State of California registered civil engineer. Certified copies of supporting laboratory trial mix reports shall be sent to Engineer from the independent testing laboratory. Do not place concrete prior to notification of completion of Engineer's review in writing. Unless the requirement is waived by Engineer, trial batch testing shall be provided in conformance with RS Subsection 201-1.1.4.

B. Design strength shall be 5,000 pounds per square inch (psi) at 28 days, unless otherwise shown on Drawings or specified in this Section. The combined aggregate grading shall conform to RS Subsection 201-1.3.2 Table 201-1.3.2 grading B 1 1/2 inch maximum except that grading D may be used where, in Engineer's opinion, placing conditions require it.

C. The water-cementitious material (cement plus fly ash) ratio (W/C ratio) shall not exceed 0.40 by weight.

D. Minimum cementitious material content used for performance and longevity, regardless of design strength, shall be 658 pounds (7 sacks) per cubic yard, consisting of 559 pounds of cement and 99 pounds of Class F fly ash. Contractor shall increase cementitious material content as required to meet strength requirements. The additional cementitious material shall have 15 percent Class F fly ash.

E. 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 W/C ratio is not exceeded.

F. No calcium chloride, in any form, shall be used in the concrete mixture.

2.2 MATERIALS

A. Cement: Type II low-alkali conforming to RS Subsection 201-1.2.1 and ASTM C150/C150M.

B. Aggregates: Conform to RS Subsection 201-1.2.2.

C. Water: Conform to RS Subsection 201-1.2.3.

D. Reinforcing:

1. Except as noted on Drawings, reinforcing bars shall be deformed and shall be in conformance with ASTM A615/A615M, Grade 60, including the supplementary requirements. Bars to be welded shall conform to ASTM A706/A706M, Grade 60. Welding electrodes for reinforcing bars shall be in conformance with AWS D1.4/D1.4M. Welding of bars is not permitted except where shown on Drawings or approved by Engineer.

2. Pile dowels, pile dowel extensions, and shearhead reinforcing shall conform to ASTM A970/A970M. The bar material for the T-headed bars shall be ASTM A706/A706M. The head plate material shall be ASTM A572/A572M, Grade 50. The plate shall be welded to the bar by friction welding conforming to AWS C6.1 and AWS D1.4/D1.4M. T-heads (head plates) shall be equal to 3 times bar diameter, or 8 times bar area. Some T-headed bars called out on Drawings show an upset end. The upset bar ends shall be equal to 1 1/2 times the bar diameter. Ends of bars shall be upset at Project Site or in a shop using an Xtender upsetting machine available through Headed Reinforcement Corporation (HRC) or a licensed distributor. The headed bars shall be capable of developing the full rupture strength of the reinforcing steel. The upset end shall also be capable of developing the full rupture strength of the reinforcing steel. T-headed bars with end plates or with upsets manufactured by HRC shall be deemed to meet Specifications.

a. Contractor may propose alternate headed bars for concrete reinforcement other than those manufactured by HRC, provided headed bars meet following requirements: Headed bars used for shearhead reinforcing shall meet ASTM A970/A970M specifications. Headed bars used for pile dowels and pile dowel extensions shall meet ASTM A970/A970M specifications and shall be certified by a full scale test of the pile/deck connection. The connection shall be detailed and the test procedure and material shall be the same as described in the paper by Sritharan and Priestly "Seismic Testing of a Full Scale Pile/Deck Connection Utilizing Headed Reinforcing, Report TR 98/14, Department of Structural Engineering, UCSD, August 1998". The paper is posted at Department's website with Reference Documents. Before performing the test, the details, procedures, and material description shall be submitted to Engineer for review. Test results shall be submitted to Engineer and shall be essentially identical or better than the results described in the previously listed paper to be reviewed. Engineer's decision shall be final. Contractor shall allow minimum of 4 weeks review time by Engineer prior to ordering the headed reinforcement.

3. Details as shown on Drawings using the headed reinforcement shall be constructed as they were detailed without alteration. Alternative reinforcement other than headed reinforcement shall not be used without Engineer's approval. If Contractor were to propose alternative reinforcement system other than headed reinforcement, submittal shall be made to Engineer. Submittal shall include adequate calculations and testing data necessary to prove the alternative system shall offer equal or better structural performance than the headed reinforcement. Contractor shall also provide Engineer with an estimated cost differential between the option of using headed reinforcement and the alternative reinforcement. Engineer's decisions on the use of a reinforcement system shall be considered final.

E. Concrete Admixtures:

1. No admixtures shall be used except those specified or approved by Engineer.

2. Concrete shall contain a water-reducing admixture. The admixture shall conform to ASTM C494/C494M, Type A or Type D, except it shall contain no chlorides, and shall be non-toxic after 30 days. The amount of admixture added to the concrete shall be in conformance with the manufacturer's written recommendations. Furnish a compliance statement that the admixture used satisfies the requirements of Specifications.

3. Concrete shall contain Class F fly ash admixture conforming to RS Subsection 201-1.2.5.

4. Air-entraining admixtures shall not be used.

F. Forms shall be constructed of plywood, hard plastic-finished plywood, or steel and shall be in conformance with RS Subsection 303-1 and ACI PRC-347.

G. Form oil shall be nonstaining colorless mineral oil, free from kerosene; flash point shall not be less than 300 degrees Fahrenheit.

H. Screed chairs shall be metal or plastic. Wood shall not be permitted.

I. Expansion joint filler and joint sealants shall conform to Drawings and RS Subsection 201-3.

J. Concrete 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/cm2/72 hours. Curing compounds shall be compatible with required finishes and/or coatings. Tests for compliance shall be made in conformance with manufacturer’s recommendations 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. Contractor shall submit certification that the product meets ASTM C309 and the additional permeability requirement; Contractor 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 conforming to RS Subsection 303-1.10.

K. Curing plastic sheet shall be 6 mil polyethylene in conformance with ASTM C171.

L. Grout 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. Spacer blocks to support reinforcing steel and maintain required bar clearance shall be made of concrete identical to that of the concrete being placed.

N. Spacers, chairs, bolsters, ties, and devices for placing, spacing, supporting, and fastening reinforcement in place shall conform to the requirements of Concrete Reinforcing Steel Institute (CRSI) Manual of Practice for Reinforced Concrete Construction.

O. Expansion joint fiber filler shall be Homex 300, manufactured by Homasote Company, (800) 257-9491. Thickness shall be as indicated on Drawings but not less than 1/2 inch.

P. Sealant for expansion and control joints shall be MasterSeal SL1 as manufactured by BASF with polyethylene backer rod (having a diameter 25 percent larger than joint) by Grainger.

Q. Anti-bonding agent shall be W.R. Meadows Duogard II Form Release. W.R. Meadows, (909) 469-2606.

R. Plastic control joint shall be Zip Cap Control Joints, by Sika Greenstreak, Saint Louis, Missouri. Joint material shall be T-shaped plastic strip 1/16 inch thick by at least 2 inches deep with suitable anchor to prevent vertical movement and with membrane 3/4-inch wide pull-top stiffener.

S. Area drain components shall be in conformance with the following requirements:

1. Metal components shall be as specified in METAL FABRICATIONS Section and STORM DRAINAGE Section.

2. Polyvinylchloride (PVC) Pipe: ASTM D1785.

3. Polyvinylchloride Fittings: ASTM D2467.

4. Expanded polystyrene shall be a commercially available polystyrene board. Expanded polystyrene shall have a minimum flexural strength of 35 pounds per square inch, minimum, determined in conformance with ASTM C203, and a compressive yield strength of between 16 and 40 pounds per square inch, at 5 percent compression. Fillers shall be held in place by waterproof adhesive, or other means subject to Engineer’s review.

T. Epoxy sealant for cut existing rebar and for rebar at control joints shall be Splash Zone A788 by Carboline.

U. Neat cement grout shall consist of cement, water, and superplasticizer conforming to RS Subsection 201-1.2.4, c. The water/cement ratio shall not exceed 0.4 (4.5 gallons per sack of cement). Grout shall be fluid so that no air voids are entrapped when dowels are inserted.

2.3 CRACK REPAIR EPOXY

A. Crack repair epoxy shall be 2 component epoxy injection, Sikadur 35, Hi-Mod LV by Sika Chemical Corp., Lyndhurst, NJ.

PART 3 - EXECUTION

3.1 PREPARATION

A. Concrete Surface Roughening: Perform roughening of concrete surfaces where shown on Drawings. Use mechanized, self-propelled equipment that produce a consistent roughness pattern at the amplitude shown on Drawings without cracking parent concrete.

1. Self-propelled concrete scarifier by Edco, Model CPU-12-35K. Edco, (800) 638-3326.

3.2 CONSTRUCTION

A. Construction shall be in accordance with Drawings, Specifications, and the standard practices and recommendations of American Concrete Institute (ACI) and CRSI.

3.3 FORMWORK

A. Formwork shall include forms, falsework, shoring, temporary supports, and other structural formwork required. Formwork shall be structurally designed by and signed by a State of California registered civil engineer. Formwork, falsework, and staylath design shall accommodate piles up to 24 inches out of alignment measured from the center line of the pile with no modifications. Formwork shall comply with applicable safety regulations, current OSHA regulations, and other codes. Refer to Price and Payment Procedures Article of this Section for formwork, reinforcing, and concrete modifications. Comply with applicable portions of ACI PRC-347, ACI CODE-318, RS Subsection 303-1.3, and this Section. Design, supervision, and construction for safety of property and personnel shall be Contractor's full responsibility.

B. If appropriately designed, the staylath system may be used as support for the formwork during wharf deck construction.

1. Contractor shall not embed any devices in the column strips of wharf deck system for purposes of supporting formwork. Only friction collars (not embedded in deck) are allowed to support formwork.

2. Formwork system shall not alter or interfere with structural components design.

C. Forming system shall be designed to support loads from the entire deck section and crane girder as though placed at one time.

D. Reuse of forms shall be permitted only if a "like new" condition is maintained, unless otherwise approved in writing by Engineer. Engineer shall be notified at least 1 full working day prior to reinforcement placement so that the forms can be inspected. Contractor shall correct any defective formwork found in Engineer's inspection, prior to placement of any reinforcement. Formwork surfaces that were in good condition and accepted for use, but were damaged during removal and handling or other procedures, shall not be reused on additional pours.

E. Construct forms suitable for removal without hammering or prying against the concrete. Remove forms in conformance with RS Subsection 303-1.4.

3.4 REINFORCEMENT PLACING

A. Place reinforcement in conformance with RS Subsection 303-1.7 unless otherwise specified in this Section or shown on Drawings.

B. Reinforcing steel shall have a minimum 3 inches of concrete cover unless otherwise noted on Drawings.

C. Additional reinforcing steel may be required due to mislocated piles. Refer to Price and Payment Procedures Article of this Section for reinforcing steel modifications.

D. 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 as manufactured by Hilti, (800) 879-8000.

2. Adhesive anchors and rebar dowels shall be installed in conformance with the manufacturer's published installation instructions and International Code Council Evaluation Service ICC-ES ESR 2322, Installation Instructions.

3. Avoid damaging or cutting the existing reinforcing bars. Locate existing rebar using non-hazardous, 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 verify 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 location 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, Section 4.4.

3.5 CONCRETE CORING

A. Core holes by methods that do not shatter or damage concrete adjacent to holes.

B. Do not start coring Work until Engineer has reviewed coring methods and equipment submittal and until Engineer is present at Project Site to observe start of coring Work.

C. Alignment of cored holes shall not deviate from dimensions shown on Drawings by more than 1/2 inch in every 10 feet of cored hole length.

D. Avoid damaging or cutting the existing reinforcing bars. Locate existing rebar using non-hazardous, non-destructive methods with accurate location tolerances (1/4 inch, plus or minus).

E. Terminate coring operations when reinforcement is cut. Propose a procedure to repair the cut reinforcement and to prevent further cutting of reinforcement. Obtain Engineer's review of procedure prior to resuming coring Work.

F. Immediately after coring, identify concrete cores with a description of the core locations for Engineer's inspection and approval. Include locations, if any, where reinforcement was cut and how it was repaired.

3.6 EXISTING REBAR

A. Where existing rebars are cut and for rebar at control joints, protect by applying Splash Zone A-788 as manufactured by Carboline.

3.7 CONCRETE MIXING

A. Concrete mixing shall conform to RS Subsection 201-1.4.

B. No water shall be added to concrete after trucks leave batch plant.

3.8 PLACING CONCRETE

A. Conform to RS Subsection 303-1 except for modifications shown on Drawings or specified in this Section. "Wharf Deck" shall be synonymous with and in lieu of "Bridge Deck".

B. Allow 7 Calendar Days between adjacent pours. A pour shall be defined as a continuous placement of concrete between construction joints.

C. The wharf deck shall be finished in conformance with RS Subsection 302-6.4 and RS Subsection 303-1.9.1, except RS Subsection 302-6.4.4 shall not apply where the deck shall not be exposed.

D. Live loading on wharf deck during curing shall be limited to the following:

1. No loading for the first 7 days and before compressive strength of concrete equals 2,400 psi.

2. After 7 days and after compressive strength of concrete equals 2,400 psi or greater, the loads shall be limited to 150 pounds per square foot uniform live load, and 12,000 pounds concentrated live load on minimum spacing of 6-foot on centers.

3. Loading shall not exceed 150 pounds per square foot until concrete has attained a compressive strength of more than 3,000 psi.

3.9 CONSTRUCTION JOINTS

A. Location and details shall be as indicated on Drawings, as specified in Specifications, or as reviewed by Engineer. Where expansion joints are not shown or where they are spaced at larger spacings, intermediate construction joints shall be provided by Contractor. Construction joints shall be oriented transversely (perpendicular to face of wharf) and the spacing between joints shall not exceed 100 feet parallel to the wharf face unless approved by Engineer in writing. Construction joints shall be located and shown on Contractor's shop drawings. Obtain approval of Engineer for final location of construction joints.

1. Locate construction joints within the middle half of the bent spacing (i.e., anywhere from 5 feet to 15 feet from the bent lines for a typical 20-foot bent) and show on shop drawings.

B. Sandblast construction joints, while concrete is fresh, to clean and roughen the surface of the joint, exposing clean coarse aggregate solidly embedded in mortar matrix. High-pressure water wash is not acceptable. Clean forms and reinforcing by means of compressed air.

C. Bonding to recently placed concrete at horizontal construction joints: after preparing the surface thoroughly clean and saturate with water, remove standing and ponded water and immediately place concrete. Recently placed concrete is defined as less than 60 days old.

D. Use offset keyways at construction joints in slabs and vertical construction joints.

3.10 EXPANSION JOINTS

A. Location and details of expansion joints are indicated on Drawings.

3.11 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Concrete shrinkage shall be less than 0.030 percent at 28 days when tested in conformance with ASTM C157/C157M.

3.12 SURFACE DEFECTS AND FISSURES

A. No rock pockets or honeycombing shall be allowed.

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 inch in depth.

C. Surface defects and fissures not accepted shall be repaired as specified in Repair of Surface Defects and Fissures Article of this Section.

3.13 REPAIR OF SURFACE DEFECTS AND FISSURES

A. Grout and dry patching material shall consist of portland cement mortar mixed in the proportion of 1 part portland cement (Type II) to 2 parts of fine sand (passing a No. 14 to 20 mesh sieve) by volume with only enough water to make a heavy mortar. No mortar shall be used which has been prepared for longer than 30 minutes and if stiffening shall occur within this period, the mix shall be discarded. No water shall be added to the mortar after it has first been prepared.

B. Preparation:

1. The depth and direction of fissures shall be ascertained by probing with a 12-gage wire, after which a drill with a 3/8- to 1/2-inch bit shall be used to enlarge the fissure to the depth and in the direction which was indicated by the probing. In the event the bit is broken off in the concrete, it shall be removed.

2. Concrete surfaces to be repaired shall be scrubbed with a coarse, stiff, short, bristle brush prior to the application of the grout dry patching. The cleaning is to uncover holes which may be concealed by a thin film of laitance or mortar.

3. The brushed surfaces shall be hosed with a pressure nozzle to remove dirt and foreign objects.

C. Repair Methods:

1. While the concrete surface is still damp, dry patching material shall be applied to indented, damp, concrete surfaces to be repaired, followed by methods which shall provide a positive bond between the patching material and concrete surface being repaired.

a. Mortar grout shall be compacted into the predrilled fissures in such a manner as to permit no voids and provide a bond between the concrete and the mortar at interfaces. Following this step, surface voids shall be dry patched by means submitted to Engineer for review.

b. Mortar grout patches shall be kept moist for not less than 5 days after placement. Patches which show secondary fissures, or which are not bonded shall be rejected and redone. In the event shrinkage occurs in the hardened patches, patches shall be removed and re-patched, using key ways by drilling or other means.

D. An epoxy-based grout shall be used to fill holes or depressions resulting from the removal of form bolts. This shall be used in place of Class "C" mortar specified in RS Subsection 303-1.9.2.

3.14 FINISHING OF CONCRETE SURFACES

A. Finish wharf deck in conformance with RS Subsection 302-6.4 and RS Subsection 303-1.9, except RS Subsection 302-6.4.2 shall not apply and RS Subsection 302-6.4.3,c and d, shall not require the use of a 16 foot long wooden float. RS Subsection 302-6.4.4 also shall not apply where the deck shall not be exposed. Work shall further conform to the following:

1. Only exposed walking surfaces of the wharf deck shall be broom finished.

2. The bottom of the power trench and utility vaults shall be given a steel trowel finish.

B. Apply an “ordinary surface finish“ to the underside of the wharf deck, outboard (waterside) face of the wharf deck continuous edge beam, unexposed surfaces of the wharf deck, and the cutoff wall in conformance with RS Subsection 303-1.9.2.

3.15 CURING

A. Cure concrete in conformance with RS Subsection 303-1.10. Earth or sand cover curing methods shall not be used.

3.16 PROTECTION

A. Protect finished concrete surfaces from stains, abrasions, and other damage.

B. Protect existing finished concrete surfaces during placement of concrete adjacent to or above such surfaces.

C. Apply Splash Zone A788 by Carboline to cut rebar ends exposed to the weather.

3.17 AREA DRAINS

A. Metal components shall be in conformance with the requirements specified in METAL FABRICATIONS Section.

B. Polystyrene filler shall be installed in place as shown on Drawings. Filler shall be held in place against the lower pipe by an adhesive approved by the polystyrene manufacturer. Polystyrene filler shall fit in and around pipes snugly.

C. Install pipe as shown on Drawings and in conformance with RS Subsection 207-17.

3.18 CRACK REPAIR

A. Cracks greater than 0.01 inch in width and less than 0.19 inch in width in the wharf structure, regardless of cause, shall be epoxy injected using 2-component epoxy as specified in this Section at Contractor's sole cost and expense. Applicators shall be certified by the epoxy manufacturer.

1. Report cracks 1/8 inch or greater in width to Engineer.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Foam-Filled Fenders:

1. Foam-filled fenders are fenders typically manufactured by wrapping closed cell foam with a nylon reinforcement embedded in a polyurethane coating. The fenders have an internal chain and are used for berthing of medium to large vessels; vessels with considerable hull curvature; and at berths that support various ship types and sizes. Fenders can be used as stand-alone fenders, fendering between ships, or between a ship and a berthing structure.

1.2 RELATED SECTIONS

A. Section 35 54 00 - Concrete Wharf Construction

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for this Work of this Section shall be paid under the Marine Fenders 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 D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension.

D. ASTM D470 - Standard Test Methods for Crosslinked Insulations and Jackets for Wire and Cable.

E. ASTM D1052 - Standard Test Method for Measuring Rubber Deterioration—Cut Growth Using Ross Flexing Apparatus.

F. ASTM D1630 - Standard Test Method for Rubber Property—Abrasion Resistance (Footwear Abrader).

G. ASTM D1667 - Standard Specification for Flexible Cellular Materials—Poly (Vinyl Chloride) Foam (Closed-Cell).

H. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness.

I. ASTM D3575 - Standard Test Methods for Flexible Cellular Materials Made from Olefin Polymers.

J. ASTM F2192 - Standard Test Method for Determining and Reporting the Berthing Energy and Reaction of Marine Fenders.

K. AWS D1.1/D1.1M - Structural Welding Code - Steel.

L. FS RR-C-271 - Chains and Attachments, Carbon and Alloy Steel.

1.5 SUBMITTALS

A. Submit the following preconstruction information and test data:

1. Manufacturers Catalog Data, to include:

a. Reaction profiles

b. Energy and percent compression curves

c. Dimensions

d. Material specifications

e. Method of manufacturer

2. Foam-Filled Fenders:

a. Dimensional Drawings of fender units including chains, anchor bolts, inserts, and end fittings.

b. Design calculation of fender and chains.

c. Performance curves showing energy/reaction load versus deflection and supporting test data.

3. Foam Core:

a. Density

b. Tensile strength

c. Elongation

d. Water absorption

e. Service temperature

f. Compressive sets

4. Fender Skin:

a. Thickness

b. Elastomer data

c. Filament wrap

d. Color

e. Repairability

5. Internal Hardware

B. Submit the following test reports as provided by the manufacturer:

1. Fender Cyclic-Compression Test

2. Fender Sustained-Load Test

3. Fender Pull-Through Test

4. Skin Thickness Core Test

5. Foam Core Density Test

C. Submit the following instruction from the manufacturer:

1. Installation Instructions

2. Repair Instructions

D. Submit the operation and maintenance data:

1. Fender Manual

E. Closeout Submittals include:

1. Foam-Filled Fenders - Warranty

1.6 QUALITY ASSURANCE

A. Elastomer Skin:

1. The elastomer skin of the fender shall be free from cracks, burrs, warpage, checks, chipped or blistered surfaces, and have a smooth surface.

B. Foam Core:

1. The foam core shall be homogeneous and of one piece fabricated construction and not be in chip or granular form. The foam core shall not contain scraps, strips, or sheets of foam either rolled or stuffed into the required shape unless pieces are bonded together in layers of uniform patterns to form a homogeneous, one piece core. Foam widths less than 48 inches are not acceptable. Homogeneous foam rings of adequate thickness to ensure performance of the fender are acceptable if a minimum 5-year performance of similar fenders is provided.

C. Steel Fabrication:

1. The steel used in fabrication shall be free from kinks, sharp bends, and other conditions which would be detrimental to the finished product. Manufacturing processes shall not reduce the strength of the steel to a value less than intended by the design. Manufacturing processes shall be done neatly and accurately. Make bends by controlled means to ensure uniformity of size and shape.

D. Welding:

1. Welding shall be in conformance with AWS D1.1/D1.1M. Provide welds of sufficient size and shape to develop the full strength of the parts connected by the welds. Welds shall transmit stress without permanent deformation or failure when the parts connected by the weld are subjected to proof and service loadings.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Fenders shall be undamaged when delivered and shall be handled and stored to prevent damage, such as bending or abrading end fittings, cutting of rubber, or damage to coating of hardware. Protect fenders from exposure to damaging liquids, oils, greases, and extended exposure to sunlight.

B. Rejection:

1. Fenders delivered to Project Site in a damaged condition or are not in conformance with this Specification are subject to rejection. Remove and replace any rejected materials with suitable materials, at no additional cost to Department.

C. Fender Marking:

1. Unless otherwise specified, fenders shall be identified in readable characters at least 1 inch high, either directly or on corrosion and sunlight resistant permanently attached tags. The markings shall include the following:

a. Full or abbreviated manufacturer name,

b. Fender size model or part number designation,

c. Fender serial number,

d. Other information as the purchase specification or contract requires.

D. Fender Instructions and Manual:

1. Provide installation instructions and a fender manual describing maintenance requirements for each fender type.

E. Handling Coated Material:

1. Store, handle, and place coated material in a manner that shall minimize damage to the coating and shall not reduce its effective protective value. Repair damaged surfaces as directed and in conformance with manufacturer's written instructions. Handle coated Work which is flexible in a manner that shall prevent flexing sufficient to crack coating, especially when temperature is below 40 degrees Fahrenheit (F). Do not place coated surfaces on strips or skids until coating has hardened thoroughly. Wide fabric slings used for lifting, and strips, slings, blocks, skids, cradles, and other supports shall provide ample bearing areas. In transporting, fasten and protect coated materials in a manner that shall prevent movement and preclude chafing and rubbing, and when unloading, do not dump or drop. Place coated material in position carefully on suitably prepared beds and with a minimum of handling.

1.8 WARRANTY

A. Furnish the manufacturer's warranty. Issue the warranty directly to Department. It shall not be limited in dollar value. The warranty period shall not be less than 1 year from the date of acceptance of Work.

PART 2 - PRODUCTS

2.1 FOAM-FILLED FENDERS

A. Prior to fabrication, submit copies of the manufacturer's catalog data including reaction, energy and percent compression curves, dimensions material specifications, and method of manufacture.

2.2 CONFIGURATION

A. Fenders shall have cylindrical mid-bodies with conical shaped ends terminating in an end fitting on the cylinder's centerline at each end. If conical ends are provided, they shall have an angle of 60 to 75 degrees, when measured from the central axis of the fender. The fittings at either end shall be connected through the center of the fender by a chain, shall terminate in a clevis fitting sized for the indicated shackle, and shall swivel to allow the end fitting to rotate freely on the axis of the fender. Design end fitting as small as possible to transmit the ultimate load of the shackle to the fender. Size the end fitting so as not to contact loading surfaces when the fender is compressed to 30 percent of its original diameter (70 percent compression). Each end fitting shall not be a continuous member; however, each independent end fitting shall be of sufficient length to span all of 3 feet in the center of the fender. Permanently affix the end fitting to the fender core with urethane elastomer prior to applying the skin. Fill interior of the fender with energy absorbing closed-cell foam as specified. The use of chipped or particulate foam is not acceptable.

B. Dimensional tolerance: Plus or minus 4 percent for diameter and length.

2.3 FOAM CORE

A. The energy absorbing foam core shall be a closed-cell, cross-linked polyethylene foam with the following properties:

1. Density, ASTM D1667, 3.3 to 6.5 pounds per cubic foot (lbs/ft3)

2. Tensile strength, ASTM D3575 or ASTM D412, 80 pounds per square inch (psi) minimum

3. Elongation (ultimate), ASTM D3575 or ASTM D412, 40 percent minimum

4. Water absorption percent volume after 24 hour exposure, ASTM D1667, 5.0 percent maximum

5. Continuous service temperature, minus 65 to 120 degrees F

6. 25 percent compressive set, ASTM D1667, 8 percent maximum

7. 50 percent compressive set, ASTM D3575, 12 percent maximum

2.4 FENDER SKIN

A. The outer fender skin shall be minimum 1.25 inches thick and constructed of elastomer as specified. Produce the fender skin with a singular homogeneous material. Multiple material types or layers are not permitted. Reinforcing is mandatory. Reinforcement utilizing a fabric is prohibited. Filament reinforcing is required. Twelve separate filament reinforcing wraps shall be applied as specified under Filament Wrap. Evenly distribute the filament wraps in the inner 80 percent to 90 percent of the coating thickness. The outer 10 percent to 20 percent of elastomer shall have no filament reinforcing. Apply the elastomer and filaments in a continuous manner to assure adhesion between the various layers. Design and size the connection of the skin to the end fittings to transmit twice the safe tensile capacity of the chain into the fender skin.

B. Dimensional Tolerance: Minus 10 percent

2.5 ELASTOMER

A. Elastomer used in the fender skin shall be non-marking solvent free 100 percent PTMEG (polytetramethylene ether glycol) polyether urethane elastomer, ultraviolet stabilized with 2.5 percent carbon black, with the following unreinforced properties:

1. Shore A. hardness, ASTM D2240, 80 to 95.

2. Tensile strength, ASTM D412, 2,800 psi minimum.

3. Elongation (ultimate), ASTM D412, 300 percent minimum.

4. Tear strength, ASTM D470, 70 pounds per inch (lbs/inch) minimum.

5. Flex life (Ross), ASTM D1052, 200,000 cycles minimum.

6. Abrasion resistance (NBS), ASTM D1630, 100 minimum.

2.6 FILAMENT WRAP

A. Construct each filament reinforcing wrap of continuous filaments applied in a helical pattern, at a helix angle of 45 to 60 degrees to the longitudinal axis of the buoy. A wrap shall consist of two such filament helixes of equal but opposing helix angles. The spacing between the filaments in the same helix shall be no more than 1/8 inch, measured in a direction parallel to the longitudinal axis of the fender. Each wrap shall extend along the entire longitudinal axis of the fender and encase the fender end fittings and secure them to the fender body. The reinforcing filaments shall be nylon tire cord of 2540 denier weight with the following properties:

1. Breaking strength, 53 pounds

2. Elongation (ultimate), 18 percent

2.7 COLOR

A. Fender skin color shall be white throughout the entire thickness. Galvanized hardware shall be unpainted.

2.8 REPAIRABILITY

A. The fender casing shall be repairable in the event of tears or punctures in the elastomer skin. The repaired area shall have not less than 90 percent of the properties as specified in Elastomer Article of this section. Required repair materials shall be readily available from the fender manufacturer.

2.9 INTERNAL HARDWARE

A. The internal chain connecting the two end fittings and the two end fittings shall be galvanized in conformance with ASTM A123/A123M or ASTM A153/A153M as appropriate. The chain and end clevis fitting shall have a minimum ultimate tensile capacity of 144,000 pounds. The internal chain and end clevis fitting shall have a minimum ultimate tensile capacity of 130,000 pounds. Shackles shall be 1 3/4 inches and have a minimum ultimate tensile capacity of 65,000 pounds.

2.10 PERFORMANCE REQUIREMENTS

A. For foam-filled fender characteristics, refer to Drawings.

B. Design the resilient, foam filled marine fenders so that when compressed across its diameter by two parallel flat plates extending the full length and width of the fender, the fender absorbs 335,790 foot-pounds of energy plus 15 percent when 60 percent compressed (i.e. to a dimension of 40 percent of its original diameter) with a corresponding load of not more than 190,125 pounds plus 15 percent. Design the fender to withstand a sustained reaction force of 150,000 pounds for a duration of not less than 24 hours each occurrence for at least 200 occurrences during its 10-year predicted life.

C. Submit the foam-filled marine fenders rated performance data (RPD) and published performance curves per ASTM F2192 or The World Association for Waterborne Transport Infrastructure PIANC Fender Guidelines 2024.

2.11 TEST REPORTS

A. Perform tests on the specified fender within 5 years of submittal of the reports for approval. Test reports shall be accompanied by notarized certificates from the manufacturer certifying that the tested material is of the same type, size, quality, manufacture and make as that proposed to be supplied. Perform the following tests:

1. Fender Cyclic-Compression Test:

a. Compress the fender along its diameter between two parallel flat plate surfaces to a compressed dimension of 40 percent of its original diameter. Repeat the compression and release cyclic loadings for a minimum of 10 full cycles of compression. Permanent deformation, cracking, or tearing of the fender skin, fender core, or end fittings shall constitute failure of this test.

2. Fender Sustained-Load Test:

    a. Apply a 150,000 pound compressive load and hold this load for 24 hours. Record load and deflection each hour. Immediately after release of the load, measure rebound of the fender. Continue to record fender rebound for 24 hours. Failure of the fender or foam core to rebound to 90 percent of its original diameter after 24 hours shall constitute failure of this test. If the foam core is not bonded to the skin of the fender, devise and execute a means for measuring rebound of the foam core and for measuring the void between the foam core and the skin. The maximum rate of compression per minute shall be 20 percent of the total reaction force at 60 percent compression. The full compression cycle, not including rebound, shall take a minimum of 5 minutes.

3. Fender Pull-Through Test:

    a. Devise and perform a test which shall measure the resistance of the end fittings and internal chain to pull through the longitudinal axis of the fender. Failure of the chain, end fittings, or skin to resist at least 40,000 pounds of pull-through tension shall constitute failure of this test. After loading, evidence of permanent deformation, cracking, or tearing of the fender or end fittings shall also constitute failure of this test.

4. Skin Thickness Core Test:

    a. After fabrication of the fenders and prior to fender shipment to Project Site, perform a minimum of 2 skin thickness tests per fender for each of 2 fenders to be selected at random by Engineer. Test locations on the fenders shall be selected by Engineer. Verify testing by an ABS inspector prior to fender shipment. Each test shall consist of taking a 1/4 inch diameter (minimum) to 1/2 inch diameter (maximum) core from the fender skin which can be removed from the skin and examined for thickness of elastomer and placement of reinforcing (when reinforcing is required). Take skin thickness measurements from the core sample and record measurements noting placement of reinforcing. Where the skin thickness measurement is less than the specified minimum, or the minimum required by the design (whichever is greater) by more than 10 percent, reject the fender. In addition, if the average of skin thickness tests for one fender is not equal to or greater than the specified minimum, or the minimum required by the design (whichever is greater), reject the fender. If tested fender is rejected, at the option of Engineer, conduct thickness tests for additional fenders. Replace rejected fenders with fenders meeting the provisions of this specification. Test replacement fenders for skin thickness as specified herein. Skin thickness tests shall be witnessed by Engineer. Notify Engineer 10 working days prior to conducting skin thickness tests. After skin thickness testing, patch core holes with elastomer of the same composition and thickness as the specified elastomer skin. Nylon reinforcing is not required in core hole patches.

5. Foam Core Density Test:

    a. During the skin thickness testing the fender shall be cored to the center of the fender (up to the internal chain). A hole saw long enough to reach the center of the fender shall be used to extract the foam sample. The fender manufacturer shall provide the ABS inspector with the appropriate hole saw to perform the test. Test the foam sample at one-foot incremental depths to determine the conformance to the density requirements of this specification. Reject fenders with nonconforming foam.

b. After skin thickness and foam core testing, patch core holes with foam of the same density (provided by the fender manufacturer with the delivery of the fenders) and elastomer of the same composition and thickness as the specified elastomer skin. Nylon reinforcing is not required in core hole patches.

c. Testing shall be verified by an ABS inspector prior to fender shipment.

2.12 CONNECTING HARDWARE

A. The connecting chain, swivel, and shackles shall be galvanized in conformance with ASTM A123/A123M or ASTM A153/A153M, as appropriate. The hardware shall be as follows:

Item	Type
Chain	ABS 2, Grade 2, Stud Link or Open Link
Shackle	FS RR-C-271, Type IVA, Class 3, Grade A
Swivel	FS RR-C-271, Type VII, Class 2

B. Connecting bolts and pins shall be of mild steel, matching the properties of the shackle bow. For Class 3 shackles, secure the bolt or pins in place with stainless steel (Type 316) cotter pins or locking pins.

PART 3 - EXECUTION

3.1 FOAM-FILLED FENDERS

A. Provide fenders as indicated on Drawings and in conformance with the manufacturer's written instructions and shop drawings. Tighten bolts an additional 1/3 turn of the nut, from the snug tight condition, and secured with cotter pins.

3.2 WELDING

A. Perform welding in conformance with AWS D1.1/D1.1M.

3.3 CONNECTIONS

A. Coat threads of bolts with anti-seized compound prior to applying washers and nuts. Recoat bolt thread projection beyond nut after tightening.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Rubber marine arch fenders

1.2 RELATED SECTIONS

A. Section 05 05 14 - Treating Damaged Galvanizing

B. Section 35 54 00 - Concrete Wharf Construction

1.3 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Payment for Work of this Section shall be paid under the Marine Fenders 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 A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

1.5 SUBMITTALS

A. Submit shop drawings and catalog cuts of the rubber fender system for Engineer's approval.

B. Submit the following information and test data:

1. Dimensional drawings of the fender units or fender units and rubbing panels showing complete assemblies including chains, anchor bolts, and inserts.

2. Design calculations of fender rubbing panels and chains (if required) furnished by manufacturer.

3. Prior to fabrication, manufacturer shall provide performance curves for the fender assemblies, showing energy/reaction load versus deflection for the range of contact angles specified. The performance curve shall be supported by test result data.

4. Fender rubbing panel data including:

    a. Coefficient of friction*

    b. Abrasion*

    c. Tensile and bending strength*

    d. Modulus of elasticity*

    e. Compressive strength*

    f. Ultra violet radiation stabilizers - material and percentages*

        *To be supported by test result data.

5. Fender, chain, anchor bolt, and concrete insert materials specifications.

6. Manufacturer's installation instruction for fenders.

1.6 WARRANTY

A. Furnish a written warranty to Engineer guaranteeing that the rubber materials furnished are free of defects in material and workmanship and agrees to remove and replace, without cost to Department, any materials which develop defects within 5 calendar years from the date of acceptance of Project as complete by Board of Harbor Commissioners.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Fender System:

1. Protective panels and other accessories shall be of a type recommended by the rubber fender manufacturer and in accordance with approved shop drawings.

2. Rubber Fenders:

    a. Fenders shall be of the following types:

        1) Arch fender shall be SAN / AN-fender as manufactured by Trelleborg.

        2) Performance requirements: For rubber arch fender characteristics refer to Drawings.

    b. Hardware:

        1) Bolts and other hardware shall conform to ASTM A307.

        2) Miscellaneous steel shapes and plates shall conform to ASTM A283/A283M .

    c. Galvanizing:

        1) Anchors, bolts, chains, washers, and metallic hardware necessary to secure the rubber fender systems shall be hot-dip galvanized to meet the requirements of ASTM A153/A153M or ASTM A123/A123M, as the type of item may indicate.

B. Furnish manufacturer's testing laboratory certification as to rubber fenders meeting specification.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install rubber fenders at the locations and in accordance with Drawings and approved shop drawings.

B. Use canvas slings, wood cradles, other protective devices, or other means recommended by the manufacturer. Hoisting and slinging by the rubber section may be permitted only when approved by the manufacturer, but caution is required to avoid cutting or wearing the rubber. Approval of shop drawings by Engineer shall not in any way relieve Contractor from taking precautions during placement to avoid cutting or tearing the rubber, and any unit so damaged shall be replaced at Contractor's sole cost and expense.

C. Install expansion bolts and anchor bolts where shown on Drawings and in conformance with the manufacturer's written instructions and approved shop drawings.

D. Contractor shall patch any unused holes caused by drilling or coring for bolts for fenders or spacers.

3.2 CLEANING AND TOUCH-UP

A. Repair damaged galvanizing as specified in TREATING DAMAGED GALVANIZING Section.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cast-steel marine bollards

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 measured on an each basis and paid under the Mooring Bollards bid item of Bid Proposal Line Items.

1.4 REFERENCES

A. AISC (MAN) - Steel Construction Manual.

B. ASTM A27/A27M - Standard Specification for Steel Castings, Carbon, for General Application.

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

D. ASTM A148/A148M - Standard Specification for Steel Castings, High Strength, for Structural Purposes.

E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

F. ASTM A536 - Standard Specification for Ductile Iron Castings.

G. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

H. Reference Specifications (RS):

Section 201 - Concrete, Mortar, and Related Materials

1.5 SUBMITTALS

A. Pre-Manufacture: Submit the following manufacturer's information for approval prior to manufacturing of bollards and hardware:

1. Shop drawings for bollard and related mounting hardware.

2. Design calculations demonstrating proposed bollard and anchor hardware meets or exceeds bollard capacity requirements using calculation methods consistent with AISC (MAN) and Design Criteria Article of this Section.

3. Grout

4. Bolts, nuts, and washers

5. Coating system data sheets

6. Pipe sleeves

7. Installation procedures

B. Post-Manufacture: Submit the following information after manufacture of bollards and hardware:

1. Certified weight tag for each bollard verifying that bollard weight is greater than minimum

2. Mill test certificates for each heat number.

3. Certificate of conformance for line pull rating.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver bollards to Project Site primed.

B. Attach weight tags indicating the weight of the bollard to each bollard prior to shipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Bollards and Hardware: Trelleborg, Website: https://www.trelleborg.com/en/marine-and-infrastructure. Phone: 713-800-7640.

2.2 DESIGN CRITERIA

A. Design and calculations shall be stamped and signed by a State of California registered civil engineer who specializes in design of marine structures.

B. Bollard's total load rating(s) indicated on Contract Drawings in directions ranging from 0 degrees to 45 degrees relative to horizontal and ranging from 0 degrees to 180 degrees relative to wharf front. The factor of safety against yielding shall be minimum of 2.0 and factor of safety against breaking shall be minimum of 3.0.

2.3 MATERIALS

A. Bollard: Bollard shall be a new tee cast iron bollard as shown on Drawings and as manufactured by Trelleborg, 200 metric tons capacity bollards. Bollard material shall be stressed-relieved cast steel conforming to ASTM A148/A148M Gr 105-85.

B. Anchorage Hardware: Through bolts shall conform to ASTM F1554. Bollard anchor hardware to be supplied by the bollard manufacturer to ensure proper fit. Anchorage hardware shall be hot-dip galvanized in conformance with ASTM A153/A153M.

C. Grout: Grout used for around base of bollard shall be non-shrink and shall have a minimum 5,000 pounds per square inch (psi) compressive strength and a maximum aggregate size of 3/8 inch.

D. Concrete for Bollard Interior: Class 560-C-3250 in conformance with RS Section 201, Table 201-1.1.2.

E. Non-sag Polyurethane Elastomeric Sealant: Sikaflex 2c NS, as manufactured by Sika Corporation.

F. Shop Finish Bollard:

1. De-burr sharp edges especially around bolt holes and other areas that abrade vessel mooring lines.

2. Primer: Factory-prime bollard with 1 coat of zinc rich primer in conformance with HIGH-PERFORMANCE COATINGS Section.

G. Finish Coat Bolts: Base plate nuts and bolt heads shall receive hot poured zinc or non-sag, polyurethane elastomeric sealant.

H. Stencil bollard serial number onto each bollard.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install sleeves in deck during placement of wharf concrete.

1. Hold bolt sleeves in place with templates that match bollard manufacturer's bolt pattern.

B. Anchorage:

1. The Tee Bollard shall be anchored to the concrete deck with a minimum of eight 2 3/4 inch diameter bolts.

2. The double-bitt bollard shall be anchored to the concrete deck with a minimum of eight M56 or equivalent.

C. Level bollards using leveling nuts on exposed bolts. Secure bolts to bollard using additional nuts and washers within bollard base.

1. Hand tighten nuts before grouting base.

2. Grout base.

3. Tighten nuts to snug condition after grout has cured for 7 days.

4. Fill cavity in bollard with concrete through hole(s) in top.

D. Finish:

1. Fill recesses around nuts and bolt heads in top of bollard base with hot poured zinc or non-sag, polyurethane elastomeric sealant to a level just above flush with base plate to prevent standing water.

2. Second Primer: After delivery, blast bollard and re-prime in conformance with HIGH-PERFORMANCE COATINGS Section.

3. Finish coat primed bollards after installation in conformance with HIGH-PERFORMANCE COATINGS Section.

a. Finish coat color: Safety yellow

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

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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.

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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.

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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)

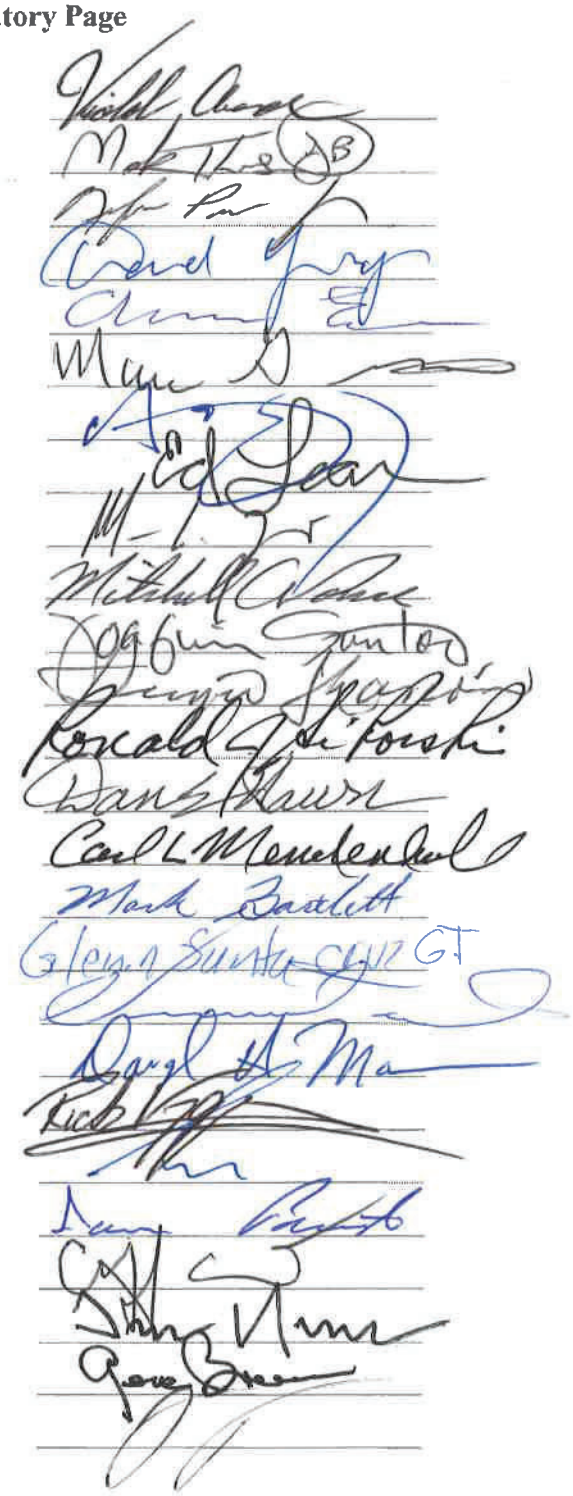
Plaster Tenders (Local 1414)

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

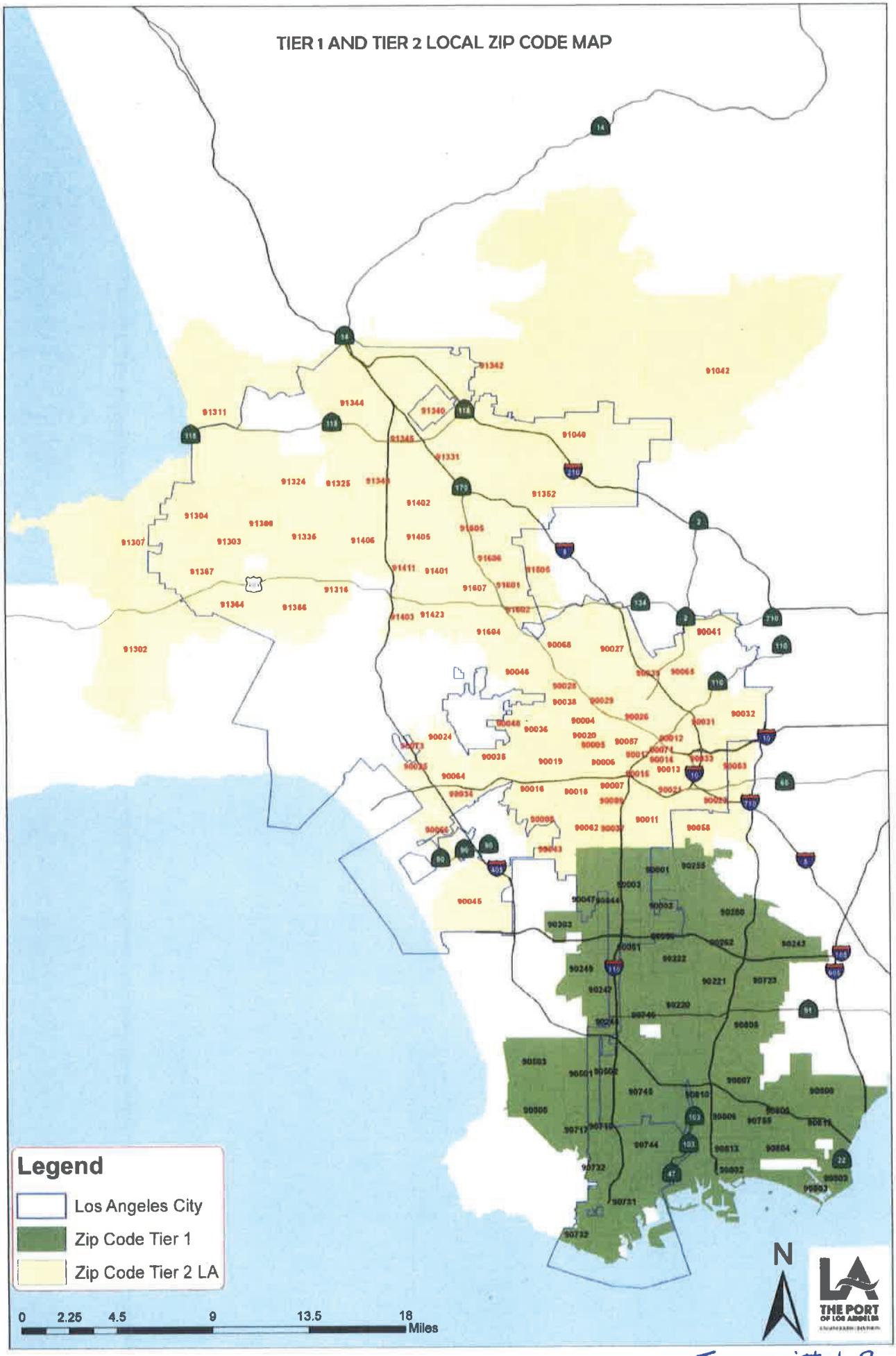
Teamsters (Local 986)
1198 Durfee Avenue
So. El Monte, CA 91733
Tel: (626) 350-9860
Fax: (626) 448-0986

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)

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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"

ENVIRONMENTAL COMPLIANCE TRACKING (ECT) FORM

Environmental Compliance Tracking (ECT) Form

PORT OF LOS ANGELES CONSTRUCTION DIVISION

Berths 49-51 Outer Harbor Cruise Terminal Development

SPECIFICATION No. 2815 **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

APPENDIX "C"

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: 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 "D"

ELECTRICAL SAFETY POLICY – IMPLEMENTATION PLAN

LOS ANGELES HARBOR DEPARTMENT

CONSTRUCTION DIVISION

ELECTRICAL SAFETY POLICY – IMPLEMENTATION PLAN

PROJECT: BERTHS 49-51 OUTER HARBOR CRUISE TERMINAL DEVELOPMENT SPECIFICATION NO: 2815

INSPECTOR: _____ DATE: _____

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.

_____ _____
Signature Date

APPENDIX "E"

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 "F"

U.S. ARMY CORPS OF ENGINEER'S PERMIT

DEPARTMENT OF THE ARMY PERMIT

Permittee: Los Angeles Harbor Department, Port of Los Angeles, Chief Harbor Engineer; Dina Aryan-Zahlan, P.E.

Project Name: Los Angeles Harbor Department Maintenance Permit

Permit Number: SPL-2022-00686-TS

Issuing Office: Los Angeles District

Note: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

Section 10: To construct structures and/or conduct work in or affecting "navigable waters of the United States", as needed for repairs and maintenance, pursuant to Section 10 of the Rivers and Harbors Act of 1899,

Section 404: To discharge fill into waters of the U.S., as needed for repairs and maintenance, pursuant to Section 404 of the Clean Water Act of 1972,

Section 103: To transport dredged or fill material by vessel or other vehicle for the purpose of dumping suitable material into ocean waters pursuant to Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972,

in association with the Los Angeles Harbor Department Maintenance Permit Project as shown on the attached drawings.

Specifically, you are authorized to:

Conduct routine maintenance on approximately 80,000 linear feet of existing wharves, structures, existing revetment fills, seawalls, bulkheads and other existing structures, and to conduct maintenance dredging at berths to address navigation safety and vessel access associated with routine Port operations and maritime shipping activity. The

applicant has requested this maintenance permit for a 10-year period. Maintenance activities may be conducted by anchored barges or support vessels, as well as crews staged on top of existing structures.

Wharf and Dike Maintenance: This includes scheduled maintenance and emergency repair, and would address maintenance of existing timber and concrete wharves. Repair and maintenance includes in-kind replacement of bearing piles, fender piles, decking, joists, pile caps, marginal beams, bull rails, and other wharf structural members. In addition, part of the wharf maintenance program consists of repairing damaged seawalls to their original condition and/or placing additional rock riprap on an existing eroded dike in order to stabilize or protect the dike. The slope of any additional fill will match the original design slope and footprint. The cubic yards of rock needed to repair dikes will vary, and in some cases rock that has sloughed off an existing slope will be recovered and replaced onto the slope.

Maintenance Dredging: This includes maintenance dredging, as needed, at berths throughout the Los Angeles Harbor to restore approved design depths which have been reduced by sediment shoaling, plus an additional 2-foot overdredge allowance. The applicant proposes an annual estimated amount of dredging and disposal of 150,000 cubic yards. On occasion, some of the work may involve maintenance of existing rock riprap slopes along channels and under wharves, as described above. Dredging would be accomplished by means of side casting, barge mounted clamshell dredge, a dredged bucket operated from the shore or adjacent wharf, or knockdown dredging. Knockdown dredging involves the leveling or spreading of shoaled or mounded material to maintain waterway depths, rather than the direct removal of material from the waterway. The disposal location would be dictated by the quality of the dredged sediment following a sediment characterization study and/or bioassay testing, and suitability determination by the interagency Southern California Dredged Material Management Team. If after sediment characterization, the sediment is found suitable for unconfined ocean disposal per the U.S. Environmental Protection Agency's (EPA) ocean disposal requirements, the designated EPA ocean dump site (LA-2) may be used for ocean disposal. Following sediment sampling and characterization, if dredged sediment is found to be unsuitable for ocean disposal, an upland/terrestrial disposal site, landfill, or the Corps-approved Berths 243-245 Confined Disposal Facility (CDF) would be used for disposal. The applicant proposes an annual estimated amount of dredging and disposal of 150,000 cubic yards.

Project Location: Maintenance activities would occur in the Los Angeles Harbor, Port of Los Angeles (Port,) within the city and county of Los Angeles, CA (approximate center point of the Port of Los Angeles near Berth 94 at latitude: 33.74861 / longitude: -118.27444).

Permit Conditions:

General Conditions:

1. **The time limit for completing the authorized activity ends September 30, 2033**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification from this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished with the terms and conditions of your permit.

7. You must notify this office as to the dates of commencement (within 10 days prior to the start of construction) and completion of the activity (within 10 days following the end of construction) using the enclosed forms.

Special Conditions:

1. The Permittee shall comply with the terms and conditions of the Clean Water Act Section 401 Water Quality Certification (WQC) (WDID No. 4WQC40123078, WQC No.

23-078, dated September 19, 2023), incorporated by reference.

2. SEDIMENT TESTING FOR PHASED PROJECTS
The Permittee is prohibited from conducting dredging operations and disposing material in navigable waters of the United States that has not been tested and determined by the Corps Regulatory Division, in consultation with the U.S. Environmental Protection Agency (EPA), to be suitable for disposal in ocean waters. Sampling and testing of previously tested sediment or previously dredged areas is required after three years from the date of initial sediment sampling and testing unless the Corps deems that conditions warrant another testing duration be formulated with EPA consultation. This time limit is subject to change at the discretion of the Corps Regulatory Division if any event causes previously determined suitable material to become potentially unsuitable. The applicant must demonstrate the proposed dredged materials are chemically and physically suitable for disposal in ocean waters according to the provisions of the Inland Testing Manual (ITM) or Ocean Disposal Manual (ODM) and the Corps Regional Guidance Letter (RGL) 06-02, as appropriate. If the material does not meet the physical and chemical criteria for unconfined disposal in ocean waters, the dredged material shall be disposed at a Corps approved upland disposal location. The applicant shall submit to the Corps Regulatory Division and EPA a draft Sampling and Analysis Plan (SAP); the SAP must be completed in accordance with the joint EPA/Corps SAPR Guidelines (July 2021). Sampling may not commence until the final SAP is approved, in writing, by the Corps Regulatory Division, in consultation with EPA. Further the SAP Results (SAPR) must also be reviewed and approved and the Permittee must receive a written authorization to proceed.

3. OPERATIONS PLAN
At least 15 calendar days before initiation of any dredging operations authorized by this permit, the Permittee shall submit a dredging and disposal Operations Plan to the Corps Regulatory Division and EPA, with the following information:

A) A list of the names, addresses and telephone numbers of the Permittee's project manager, the contractor's project manager, the dredging operations inspector, the disposal operations inspector and the captain of each tug boat, hopper dredge or other form of vehicle used to transport dredged material to the designated disposal site.

B) A list of all vessels, dredging equipment and electronic positioning systems or navigation equipment to be used for dredging and disposal operations, including: the capacity, load level and acceptable operating sea conditions for each hopper dredge or disposal barge or scow.

C) A schedule describing when the dredging project is planned to begin and end.

D) A pre-construction dredging bathymetric survey (presented as a large format plan view drawing), taken within thirty (30) days before the dredging begins, accurate to 0.5-

foot with the exact location of all soundings clearly defined on the survey chart. The pre-dredge survey chart shall be prepared showing the following information:
i) The entire dredging area, including the toe and top of all side-slopes, and typical cross sections of the dredging areas. To ensure that the entire area is surveyed, the pre-dredge condition survey should cover an area at least 50 feet outside the top of the side-slope or the boundary of the dredging area.
ii) Areas shallower than the dredging design depth shall be shaded green, areas between the dredging design depth and overdredge depth shall be shaded yellow, and areas below overdredge depth that will not be dredged shall be shaded blue.
iii) The pre-dredging survey chart shall be signed by the Permittee to certify that the data are accurate and that the survey was completed within thirty (30) days before the proposed dredging start date.

E) A debris management plan to prevent unauthorized disposal of large debris or other unsuitable materials. The debris management plan shall include: sources and expected types of debris if known, debris separation and retrieval methods and equipment to be used, debris disposal location(s), and debris disposal methods (e.g., recycling, landfill, hazardous/toxic/radioactive materials/munitions disposal sites, etc.).

F) Dredging and dredged material disposal and monitoring of dredging projects using the National Dredging Quality Management (DQM) system shall be implemented for this permit. The permittee's DQM system must have been certified by the DQM Support Center within one calendar year prior to the initiation of the dredging/disposal. Questions regarding certification should be addressed to the DQM Support Center at 1-877-840-8024. Additional information about the DQM System can be found at https://dqm.usace.army.mil. The permittee is responsible for insuring that the DQM system is operational throughout the dredging and disposal project and that project data are submitted to the DQM Support Center in accordance with the specifications provided at the aforementioned website. The data collected by the DQM system shall, upon request, be made available to the Regulatory Division project manager of the U.S. Army Corps of Engineers, Los Angeles District.

4. NOTICE TO PROCEED
The Permittee shall not commence dredging or disposal operations unless and until the Permittee receives a Notice to Proceed (NTP), in writing (letter or email), from the Corps Regulatory Division.

5. MAINTAIN PRINTED COPY OF PERMIT ON-BOARD
The Permittee and its contractors and subcontractors shall maintain a copy of this permit at the work site, and on all vessels used to dredge, transport and dispose of dredged material authorized under this permit.

6. CAPTAIN LICENSING
The Permittee shall ensure that the captain of any hopper dredge, tug or other vessel

used in the dredging and disposal operations, is a licensed operator under U.S. Coast Guard regulations and follows the Inland and Ocean Rules of Navigation or the U.S. Coast Guard Vessel Traffic Control Service. All such vessels, hopper dredges or disposal barges or scows, shall have the proper day shapes (mast head signals which indicate vessel operational status), operating marine band radio, and other appropriate navigational aids.

7. RADIO CHANNEL MONITORING
The Permittee's contractor(s) and the captain of any vessel covered by this permit shall monitor VHF-FM channels 13 and 16 while conducting dredging operations.

8. INSPECTIONS
Upon request, the Permittee and its contractor(s) shall allow inspectors from the Corps Regulatory Division (may include other Corps Divisions), EPA, and(or) the U.S. Coast Guard to inspect all phases of the dredging and disposal operations. Upon request, the Permittee and its contractor(s) retained to perform work authorized by the permit or to monitor compliance with this permit shall make available to inspectors from the Corps EPA, and(or) the U.S. Coast Guard the following: dredging and disposal operations inspectors' logs, the vessel track plots and all disposal vessel logs or records, any analyses of the characteristics of dredged material, or any other documents related to dredging and disposal operations.

9. INTERFERENCE WITH NAVIGATION
During disposal and dredging operations the permitted activity shall not interfere with the public's right to free navigation on all navigable waters of the United States.

10. NON-COMPLIANCE NOTIFICATION
If non-compliance of the permit occurs, the Permittee shall report the details of the permit non-compliance to the Corps Regulatory Division within twenty-four (24) hours. If the Permittee retains any contractors to perform any activity authorized by this permit, the Permittee shall instruct all such contractors that any permit non-compliance of any permit condition must be reported to the Permittee immediately who must then report to the Corps Regulatory Division.

11. HOPPER DREDGE OPERATION
When using a hopper dredge, water/slurry flowing through the weirs shall not exceed 10 minutes during dredging operations (to prevent overflow/overload). When using a hopper dredge, the fill level of the hopper dredge shall not exceed the load line to prevent any dredged material or water from spilling over the sides at the dredging site or during transit from the dredging site to the disposal site. No hopper dredge shall be filled above this predetermined level. Before each hopper dredge is transported to the disposal site, the dredging site inspector shall certify that it is filled correctly. If a dredging or disposal operation does not require a hopper dredge than disregard this special condition.

12. BARGE OR SCOW OPERATIONS

When using a disposal barge or scow, no water shall be allowed to flow over the sides throughout the dredging and disposal operations. The fill level of the disposal barge or scow shall not exceed the load line to prevent any dredged material or water from spilling over the sides during all operations. No disposal barge or scow shall be filled above this predetermined level or load line (vessel frame/plating). Before each disposal barge or scow is transported to the disposal site, the Permittees dredging site inspector shall certify that it is filled correctly.

13. ELECTRONIC POSITIONING SYSTEM NAVIGATION

The Permittee shall use an electronic positioning system to navigate throughout all dredging, hauling, disposal, and discharge operations. The electronic positioning system shall have a minimum accuracy and precision of +/- 10 feet (or 3 meters). If the electronic positioning system fails or navigation problems are detected, all dredging operations shall cease until the failure or navigation problems are corrected.

14. POST-CONSTRUCTION REPORTING

The Permittee shall submit a post-construction/project completion report to the Corps Regulatory Division within 30 calendar days after completion of each dredging event to document compliance with all general and special conditions in this permit. The report shall include all information collected by the Permittee, the dredging operations inspector and the disposal operations inspector or the disposal vessel captain. One post-construction report (instead of separate reports) should be submitted for all activities conducted under the permit. The report must describe whether or not all general and special conditions were met. The report shall include:

A) Project Name and Corps file number (Corps File No. is SPL-2022-00686).

B) Start date (month/day/year) and completion date of dredging and disposal operations.

C) The disposition and total cubic yards of all material disposed or discharged at each site or location.

D) Dredging method (e.g., hopper dredge, suction dredge, clamshell, dragline, etc.).

E) Mode of transportation.

F) Frequency of disposal and plots of all trips to the disposal or discharge site(s).

G) Tug boat or other disposal vessel logs documenting contact with the U.S. Coast Guard before each trip to the disposal or discharge site(s).

H) A detailed post-dredging bathymetry survey drawing of the dredging area. The survey drawing shall show areas above the dredging design depth shaded green, areas between the dredging design depth and overdredge depth shaded yellow, areas below overdredged depth that were not dredged or areas that were deeper than the overdredge depth before the project began as indicated on the pre-dredging survey shaded blue, and areas dredged below the overdredge depth or outside the project boundaries shaded red. The methods used to record the post-construction dredging survey drawing shall be the same methods used in the pre-construction dredging survey

drawing. The survey drawing shall be signed by the Permittee certifying that the data are accurate.
I) A description of any navigation problems and corrective measures implemented.
J) Copies of all completed Scow Certification Checklists for ocean disposal.

Section 103 Special Conditions (Ocean Disposal at EPA approved site):

15. This permit does not authorize ocean disposal. Based on the results of the Sampling and Analysis Plan Report (see Special Condition No. 2 above), if the EPA concurs that sediment is suitable for ocean disposal, EPA site use conditions and the Corps NTP (see Special Condition No. 3 above) shall be obtained prior to initiating dredging and disposal at an EPA-approved ocean disposal site.

Endangered Species Special Conditions:

1. This Corps permit does not authorize you to take any threatened or endangered species, in particular the California least tern (*Sterna antillarum browni*) or green sea turtle (*Chelonia mydas*) or adversely modify designated critical habitat. In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g. ESA Section 10 permit, or a Biological Opinion (BO) under ESA Section 7, with "incidental take" provisions with which you must comply).

2. No maintenance activity shall be performed within 500 feet of the California least tern nest site on Pier 400 during the nesting season. The Permittee shall provide one week advance notice of proposed pile-driving, including measures to minimize impacts on least terns to both the Corps and U.S. Fish and Wildlife Service that would occur during the nesting season, including a description of any concurrent work occurring in the same time frame within a one mile radius of the Pier 400 nest site. Structure maintenance and replacement or repair of fenders and bollards within the aforementioned distances from the nest site is not required.

3. In the unlikely event that any individuals of fish, whale, abalone, sea turtle, coral, or marine plant species listed by NOAA Fisheries under the Endangered Species Act appear to be entangled, injured, or killed as a result of the structures or work in [navigable] waters of the United States authorized by this permit, the permittee or designated representative shall immediately report the event to the Regulatory Office of the Los Angeles District of the U.S. Army Corps of Engineers at 805-585-2146 AND NOAAs Entanglement hotline 1-877-767-9425 or NOAAs West Coast Region Stranding hotline 1-866-767-6114. If you have any trouble contacting these hotlines, please immediately NOAAs Regional Stranding Coordinator, Justin Viezbicke, at 562-506-4315 or NOAAs Assistant Stranding Network Coordinator,

Justin Greenman, at 707-496-7230. The finder should leave the plant or animal alone, make note of any circumstances likely causing the death or injury, note the location and number of individuals involved and, if possible, take photographs. Adult animals should not be disturbed unless circumstances arise where they are obviously injured or killed by discharge exposure, or some unnatural cause. The finder may be asked to carry out instructions provided by NOAA Fisheries to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.

Historic Properties Special Conditions:

1. In each case involving a repair or replacement activity subject to this permit proposes to 1) repair or replace more than 20% of viewable wharf, and 2) at a wharf that is at least 50 years old, unless the proposed activity would be limited to wharf components that have been replaced in the previous 50 years, the Permittee shall notify the Corps Regulatory Division in writing at least one month prior to commencing the proposed activity to determine whether consultation with the State Historic Preservation Officer (SHPO) is necessary pursuant to section 106 of the National Historic Preservation Act. The Permittee shall not commence with the proposed activity until the Corps Regulatory Division issues a Notice to Proceed.

2. Pursuant to 36 C.F.R. section 800.13, in the event of any discoveries during construction within waters within the Corps Permit Area (the permit area is defined as waters of the U.S. below the plane of the high tide elevation of approximately +7.3 feet mean lower low water) and 100 feet landward of the pierhead line; the vertical permit area includes the previously approved design depth of berthing areas to be dredged and the depth of existing piles) of either human remains, archaeological deposits, or any other type of historic property, the Permittee shall notify the Corps Regulatory Project Manager (Theresa Stevens at 805-585-2146) and the Corps' Regulatory Archaeology Staff (Danielle Storey 213-452-3855) within 24 hours. The Permittee shall immediately suspend all work in any area(s) where potential cultural resources are discovered. The Permittee shall not resume construction in the area surrounding the potential cultural resources until the Corps Regulatory Division re-authorizes project construction, per 36 C.F.R. Section 800.13.

Section 10 Special Conditions (Work and Structures in Navigable Waters of the United States):

1. ANNUAL REPORT OF STRUCTURAL AND ROCK DIKE MAINTENANCE: The Permittee shall submit an annual report of maintenance activities on structures and rock dikes; this report shall include the berth number(s), the number of piles repaired

or replaced, an estimate of the area and cubic yards of rock dike affected by the maintenance activity. The annual report shall be submitted in January of each year.

2. INTERFERENCE WITH NAVIGATION: The permitted activity shall not interfere with the right of the public to free navigation on all navigable waters of the United States as defined by 33 C.F.R. Part 329.

3. PILES: Creosote treated pilings shall not be placed in navigable waters unless conditions A-E are met. Condition F is required to reduce adverse effects of noise and vibration. Condition G is required to reduce adverse effects on water quality.

A) The project involves the repair of existing structures that were originally constructed using wood products;

B) The creosote treated pilings are wrapped in plastic;

C) Measures are taken to prevent damage to plastic wrapping from boat use. Such measures may include installation of rub strips or bumpers;

D) The plastic wrapping is sealed at all joints to prevent leakage; and

E) The plastic material is expected to maintain its integrity for at least ten years, and plastic wrappings that develop holes or leaks must be repaired or replaced in a timely manner by the Permittee.

F) A soft-start or ramp-up method shall be used during pile driving. Alternative noise-reduction measures (bubble curtain, pipe-in-pipe, or equivalent) may also be used during pile driving to further reduce noise.

G) Turbidity reduction measures shall be implemented when installing or removing piles with a jet device.

4. LIMITATIONS: No other modifications or work shall occur to the structure permitted herein.

5. CLEAN CONSTRUCTION PRACTICES: The Permittee shall discharge only clean construction materials suitable for use in the oceanic environment. The Permittee shall ensure no debris, soil, silt, sand, sawdust, rubbish, cement or concrete washings thereof, oil or petroleum products, hazardous/toxic/radioactive/munitions from construction or dredging or disposal shall be allowed to enter into or placed where it may be washed by rainfall or runoff into waters of the United States. Upon completion of the project authorized herein, any and all excess material or debris shall be completely removed from the work area and disposed of in an appropriate upland site.

6. OBSTRUCTIONS: The Permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the Permittee will be required, upon due notice from the Corps of Engineers Regulatory Division, to remove, relocate, or alter the

structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

7. U.S. COAST GUARD NOTIFICATION: To ensure navigational safety, the Permittee shall provide appropriate notifications to the U.S. Coast Guard as described below:

Local Notice to Mariners, 11th Coast Guard District
TEL: (510) 437-2980
Email: d11LNM@uscg.mil
Website: https://www.pacificarea.uscg.mil/Our-Organization/District-11/Prevention-Division/LnmRequest/

U.S. Coast Guard, District 11, LA-LB Sector
Captain of the Port (COTP)
Email: d11-SMB-SectorLALB-WWM@uscg.mil

A) The Permittee shall notify the U.S. Coast Guard, Commander, 11th Coast Guard District (dpw) and the U.S. Coast Guard, Sector LA-LB (COTP) (contact information shown above), not less than 14 calendar days prior to commencing work and as project information changes. The notification shall be provided by email with at least the following information, transmitted as an attached Word or PDF file:

1) Project description including the type of operation (i.e. dredging, diving, construction, etc).
2) Location of operation, including Latitude / Longitude (NAD 83).
3) Work start and completion dates and the expected duration of operations. The U.S. Coast Guard needs to be notified if these dates change.
4) Vessels involved in the operation (name, size and type).
5) VHF-FM radio frequencies monitored by vessels on scene.
6) Point of contact and 24 -hour phone number.
7) Potential hazards to navigation.
8) Chart number for the area of operation.
9) Recommend the following language be used in the Local Notice to Mariners: "Mariners are urged to transit at their slowest safe speed to minimize wake, and proceed with caution after passing arrangements have been made."

B) The Permittee and its contractor(s) shall not remove, relocate, obstruct, willfully damage, make fast to, or interfere with any aids to navigation defined at 33 C.F.R. chapter I, subchapter C, part 66. Not less than 30 calendar days in advance of operating any equipment adjacent to any aids to navigation that require relocation or removal, the Permittee shall notify, in writing, the Eleventh U.S. Coast Guard District and the Corps Regulatory Division. The Permittee and its contractor(s) are prohibited from relocating or removing any aids to navigation until authorized to do so by the Corps

Regulatory Division and the U.S. Coast Guard.

C) The Permittee is prohibited from establishing private aids to navigation in navigable waters of the United States until authorized to do so by the Corps Regulatory Division and the U.S. Coast Guard. Should the Permittee determine the work requires the temporary placement and use of private aids to navigation in navigable waters of the United States, the Permittee shall submit a request in writing to the Corps Regulatory Division and the U.S. Coast Guard.

D) The COTP may modify the deployment of marine construction equipment or mooring systems to safeguard navigation during project construction. The Permittee shall direct questions concerning lighting, equipment placement, and mooring to the appropriate COTP.

8. COMMENCEMENT AND COMPLETION NOTIFICATION: The Permittee shall notify the Corps Regulatory Division of the date of commencement of work in navigable waters of the United States (within 10 calendar days prior to the start of construction) and completion of the activity (within 10 calendar days following the end of construction); electronic mail notification is preferred.

9. CAULERPA PRE-CONSTRUCTION SURVEY: For maintenance dredging activities, a pre-construction survey of the project area for Caulerpa sp. (Caulerpa) shall be conducted by a certified Caulerpa surveyor in accordance with the Caulerpa Control Protocol (see https://media.fisheries.noaa.gov/2021-12/caulerpa-control-protocol-v5.pdf) not earlier than 90 calendar days prior to planned construction and not later than 30 calendar days prior to construction. The results of this survey shall be furnished to the Corps Regulatory Division, NOAA Fisheries, and the California Department of Fish and Wildlife (CDFW) at least 15 calendar days prior to initiation of dredging in navigable waters. In the event that Caulerpa is detected within the project area, the Permittee shall not commence work until such time as the infestation has been isolated, treated, and the risk of spread is eliminated as confirmed in writing by the Corps Regulatory Division, in consultation with NOAA Fisheries and CDFW.

10. EELGRASS SURVEYS: Prior to each qualifying maintenance event, a pre-construction eelgrass survey should be conducted in accordance with the California Eelgrass Mitigation Policy (CEMP, 2014) (https://www.fisheries.noaa.gov/resource/document/california-eelgrass-mitigation-policy-and-implementing-guidelines). Qualifying maintenance events are those involving maintenance dredging or repair or replacement of more than 10 piles, where the activity is in water shallower than -20 feet Mean Lower Low Water, and occurring on the water-side half of a wharf where light conditions would allow for eelgrass growth. Pre-construction survey results must be submitted to the Corps and NOAA Fisheries at least 15 calendar days prior to the scheduled start date for work in waters of the United States. If the pre-construction survey

demonstrates eelgrass presence within 25 feet of the construction footprint, a post-construction survey should be conducted within 30 days of project completion. Should this survey determine impacts, up to two additional annual post-construction surveys may be conducted in accordance with the mapping guidelines in the CEMP. All required post-construction surveys shall be submitted by the Permittee to the Corps and NOAA Fisheries within 30 calendar days of each survey completion date. Based upon the post-construction survey results and in accordance with current regulations and policy, the Corps will determine the need and/or amount of Essential Fish Habitat (EFH) mitigation required to offset adverse impacts to such habitat. The Corps will transmit its determination to the Permittee in writing. Within 60 calendar days of receiving the Corps' determination specifying the need and amount of mitigation, the Permittee shall submit a draft EFH mitigation plan to the Corps for review and approval. The EFH mitigation plan shall be prepared in accordance with current Corps regulations and policy. The Permittee shall fully implement the final EFH mitigation plan as approved by the Corps.

Further Information:

1. Congressional Authorities. You have been authorized to undertake the activity described above pursuant to:

(x) Section 10 of the River and Harbor Act of 1899 (33 U.S.C. 403).

(x) Section 404 of the Clean Water Act (33 U.S.C. 1344).

(x) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measure ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest

decision, the Corps will normally give you favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

PERMITTEE

9/29/23
DATE

Dina Aryan-Zahlan, P.E.
Chief Harbor Engineer

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

2023.10.10 12:43:33
-07'00'

AARON O. ALLEN, PHD
CHIEF NORTH COAST BRANCH
REGULATORY DIVISION

DATE

ON BEHALF OF:

ANDREW J. BAKER
District Engineer
Colonel, U.S. Army

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

TRANSFEREE

DATE

LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS

NOTIFICATION OF COMMENCEMENT OF WORK
DEPARTMENT OF THE ARMY PERMIT

Permit Number: *SPL-2022-00686-TS*

Name of Permittee: *Los Angeles Harbor Department, Port of Los Angeles, Chief Harbor Engineer, Dina Aryan-Zahlan, P.E.*

Date of Issuance: *September 29, 2023*

Date work in waters of the U.S. will commence: _____

Estimated construction period (in weeks): _____

Name & phone of contractor (if any): _____

Please note that your permitted activity is subject to a compliance inspection by an Army Corps of Engineers representative. If you fail to comply with this permit you may be subject to permit suspension, modification, or revocation.

I hereby certify that I, and the contractor (if applicable), have read and agree to comply with the terms and conditions of the above referenced permit.

_____

Signature of Permittee Date

At least ten (10) days prior to the commencement of the activity authorized by this permit, sign this certification and email it to theresa.stevens@usace.army.mil or.

LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS

NOTIFICATION OF COMPLETION OF WORK AND CERTIFICATION OF COMPLIANCE WITH DEPARTMENT OF THE ARMY PERMIT

Permit Number: *SPL-2022-00686-TS*

Name of Permittee: *Los Angeles Harbor Department, Port of Los Angeles, Chief Harbor Engineer, Dina Aryan-Zahlan, P.E.*

Date of Issuance: *September 29, 2023*

Date work in waters of the U.S. completed: _____

Construction period (in weeks): _____

Name & phone of contractor (if any): _____

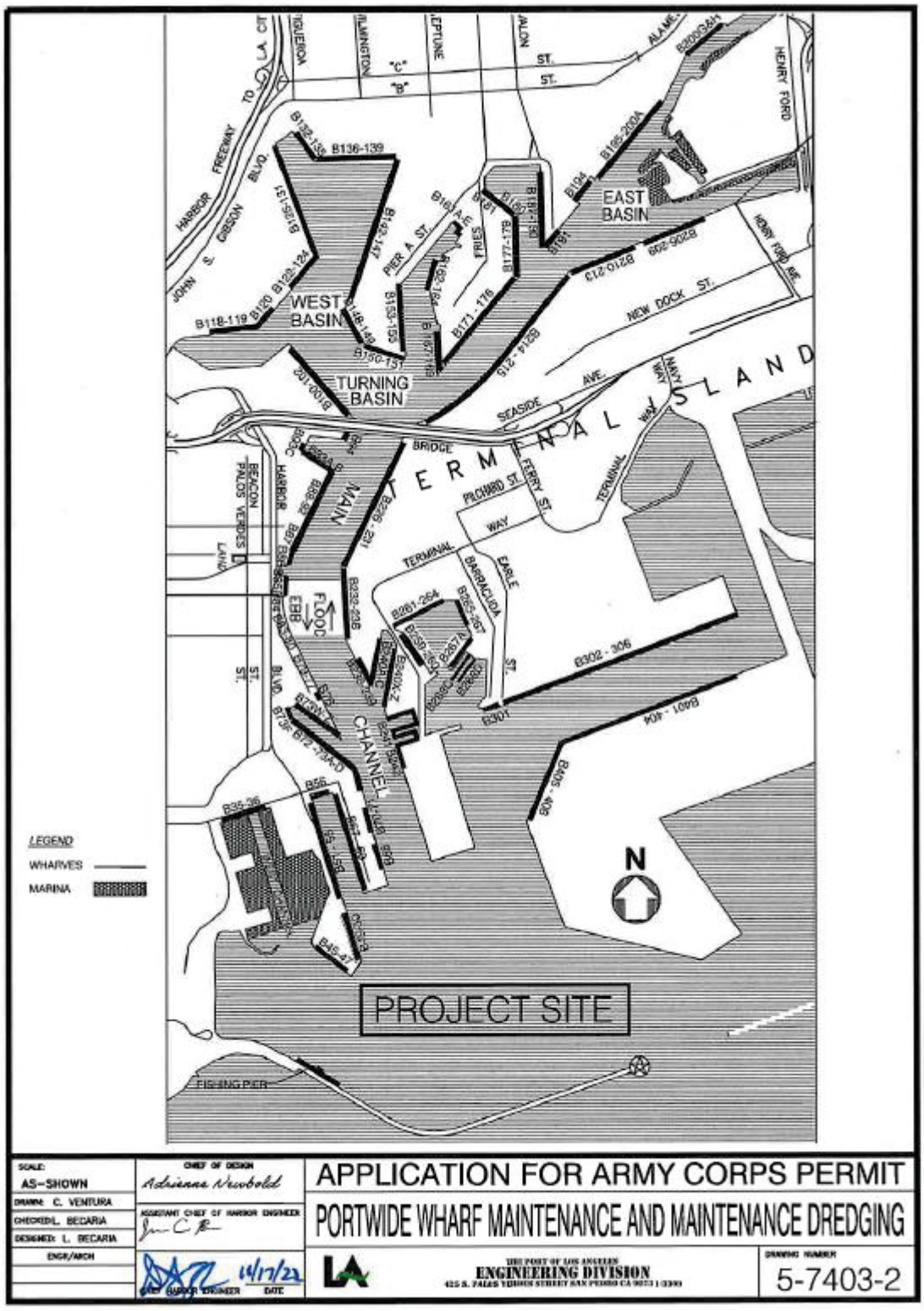
Please note that your permitted activity is subject to a compliance inspection by an Army Corps of Engineers representative. If you fail to comply with this permit you may be subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of said permit.

_____

Signature of Permittee Date

Upon completion of the activity authorized by this permit, sign this certification and email it to theresa.stevens@usace.army.mil or.



SCALE: AS-SHOWN	CHIEF OF DESIGN: Adrianna Nevobold	APPLICATION FOR ARMY CORPS PERMIT
DRAWN: C. VENTURA	ASSISTANT CHIEF OF HARBOR ENGINEER	PORTWIDE WHARF MAINTENANCE AND MAINTENANCE DREDGING
CHECKED: L. BECARIA		
DESIGNED: L. BECARIA		
ENGR/ARCH	11/17/21 DATE	THE PORT OF LOS ANGELES ENGINEERING DIVISION 425 S. PALOS VERDES STREET SAN PEDRO CA 90731-3309
		DRAWING NUMBER 5-7403-2

1

[1] Port of Los Angeles Vicinity Map with Wharves and Marinas

SCOPE OF WORK:

WHARF AND DIKE MAINTENANCE

1. PERFORM REPAIRS AND MAINTENANCE OF EXISTING TIMBER AND CONCRETE WHARVES AS SHOWN ON DRAWING 5-7403-2 THROUGH 5-7403-7.

2. REPAIR AND MAINTENANCE TO INCLUDE DECKING, JOISTS, PILE CAPS, MARGINAL BEAMS, FENDER & BEARING PILES, BULLRAILS, AND OTHER WHARF STRUCTURAL MEMBERS.

3. REPAIR CRACKED AND SPALLED SEAWALLS TO ITS ORIGINAL CONDITION.

4. PLACE NEW RIPRAP OVER EXISTING ERODED DIKE TO STABILIZE OR PROTECT EXISTING DIKE. NEW FILLED SLOPE SHALL MATCH ORIGINAL DESIGN SLOPE.

5. NO CONSTRUCTION MATERIAL SHALL BE ALLOWED TO BE DEPOSITED INTO THE WATER OR ONTO THE EXISTING ROCK SLOPE.

6. ALL WORK TO BE COORDINATED WITH TERMINAL OPERATOR AND ADJACENT TENANTS.

MAINTENANCE DREDGING

1. MAINTENANCE DREDGING WILL TAKE PLACE AS NEEDED.

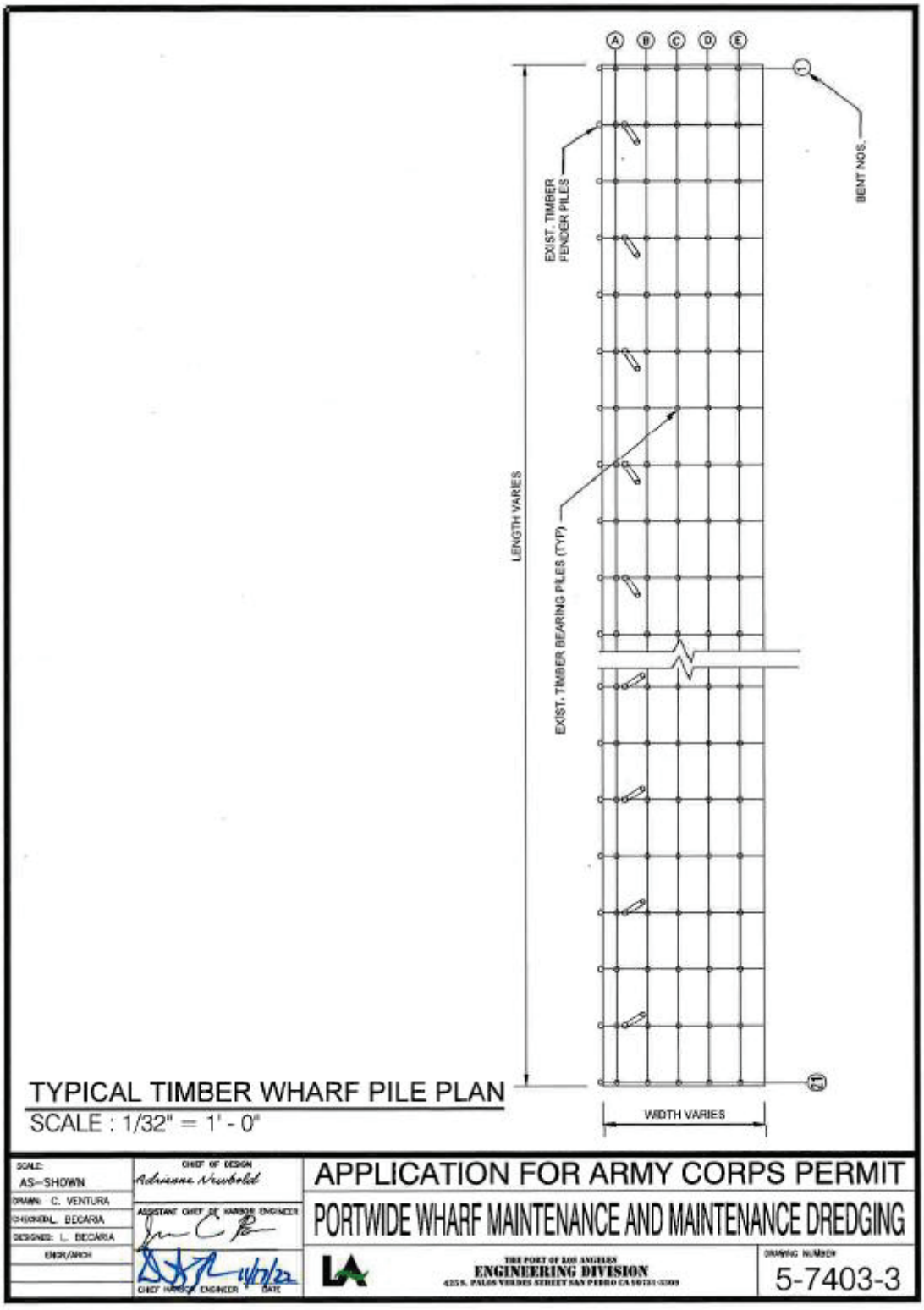
2. PERFORM MAINTENANCE DREDGING AT SITES THROUGHOUT THE LOS ANGELES HARBOR TO RESTORE APPROVED DESIGN DEPTHS REDUCED BY SHOALING WITH SEDIMENT.

3. DREDGING WILL BE ACCOMPLISHED BY MEANS OF SIDECASTING, BARGE MOUNTED CLAMSHELL DREDGE, AND/OR BY BUCKET FROM SHORE/WHARF AND KNOCKDOWN DREDGING. THE DISPOSAL LOCATION WILL BE DICTATED BY THE QUALITY OF THE MATERIAL AS INDICATED IN A SEDIMENT CHARACTERIZATION STUDY AND/OR BIOASSAY TESTING. IF THE SEDIMENT IS FOUND TO MEET ENVIRONMENTAL PROTECTION AGENCY'S (EPA) OCEAN DISPOSAL REQUIREMENTS, THE DESIGNATED EPA DUMP SITE "LA-2" OR THE OTHER APPROVED SITE, WILL BE USED FOR OCEAN DISPOSAL. IF EXCAVATED DREDGE SEDIMENTS ARE UNACCEPTABLE FOR OCEAN DISPOSAL, A SUITABLE LAND DISPOSAL SITE WILL BE USED, SUCH AS BERTH 243-245, CONFINED DISPOSAL FACILITY (CDF).
KNOCKDOWN DREDGING INVOLVES THE LEVELING OR SPREADING OF SHOALED OR MOUNDED MATERIAL TO MAINTAIN WATERWAY DEPTHS, RATHER THAN THE DIRECT REMOVAL OF MATERIAL FROM THE WATERWAY.

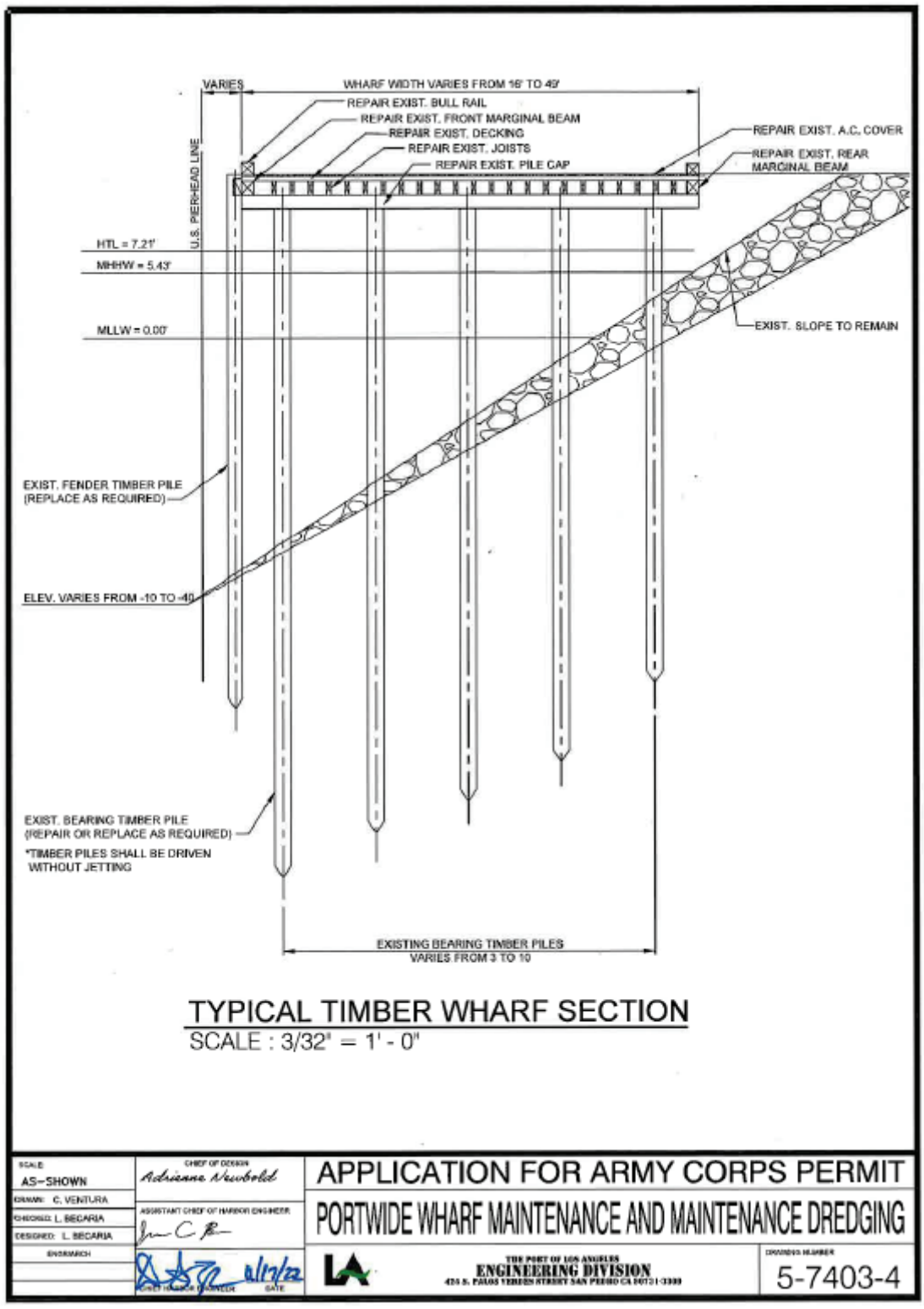
SCALE: AS-SHOWN DRAWN: C. VENTURA CHECKED: L. BECARIA DESIGNED: L. BECARIA ENGR/ARCH	CHIEF OF DESIGN: Adrienne Newbold ASSISTANT CHIEF OF HARBOR ENGINEER CHIEF HARBOR ENGINEER — DATE	APPLICATION FOR ARMY CORPS PERMIT PORTWIDE WHARF MAINTENANCE AND MAINTENANCE DREDGING THE PORT OF LOS ANGELES ENGINEERING DIVISION 425 S. PALOS VERDES STREET SAN PEDRO CA 90731-3309 DRAWING NUMBER: 5-7403-10

[1]

[1] Port of Los Angeles Wharf Maintenance and Maintenance Dredging Scope of Work for Army Corps Permit Application

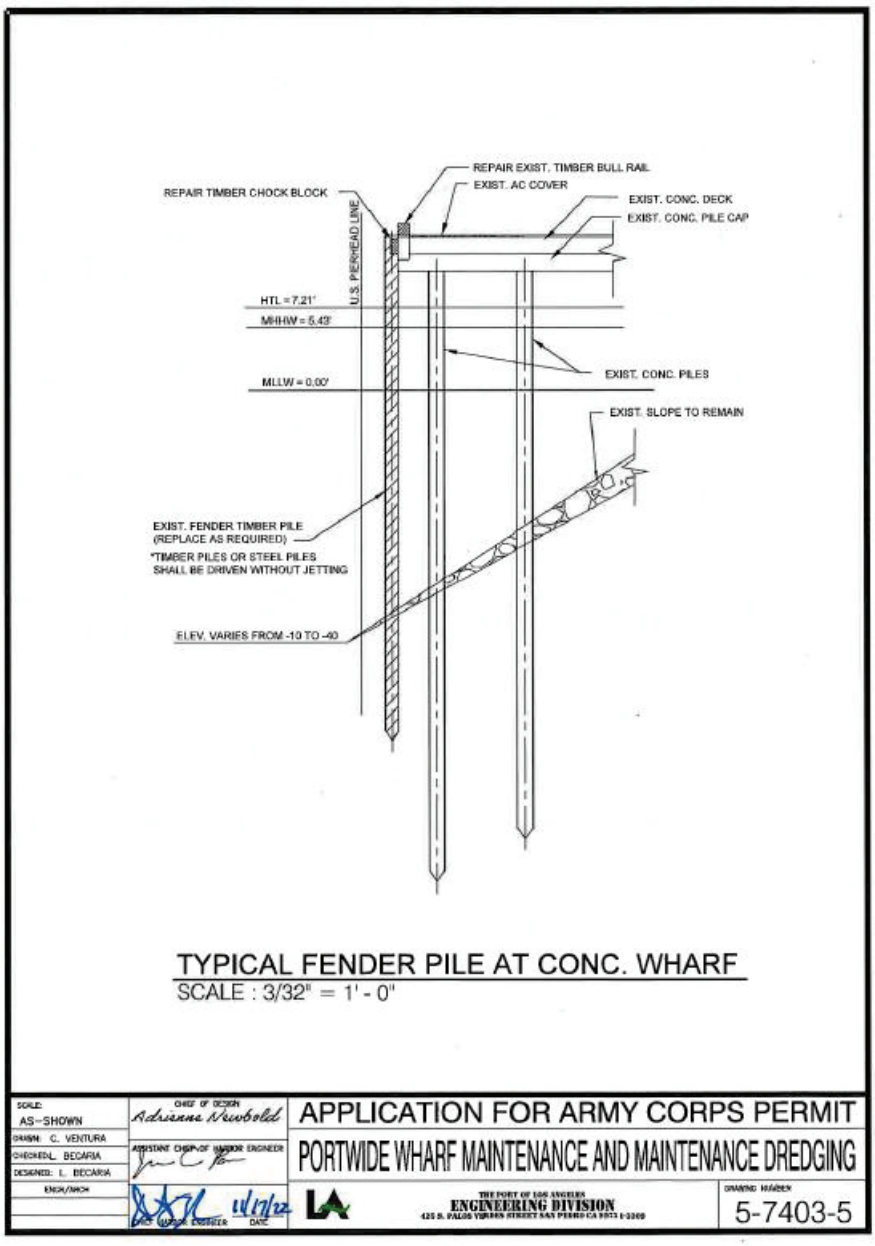


[1] Port of Los Angeles Typical Timber Wharf Pile Plan View



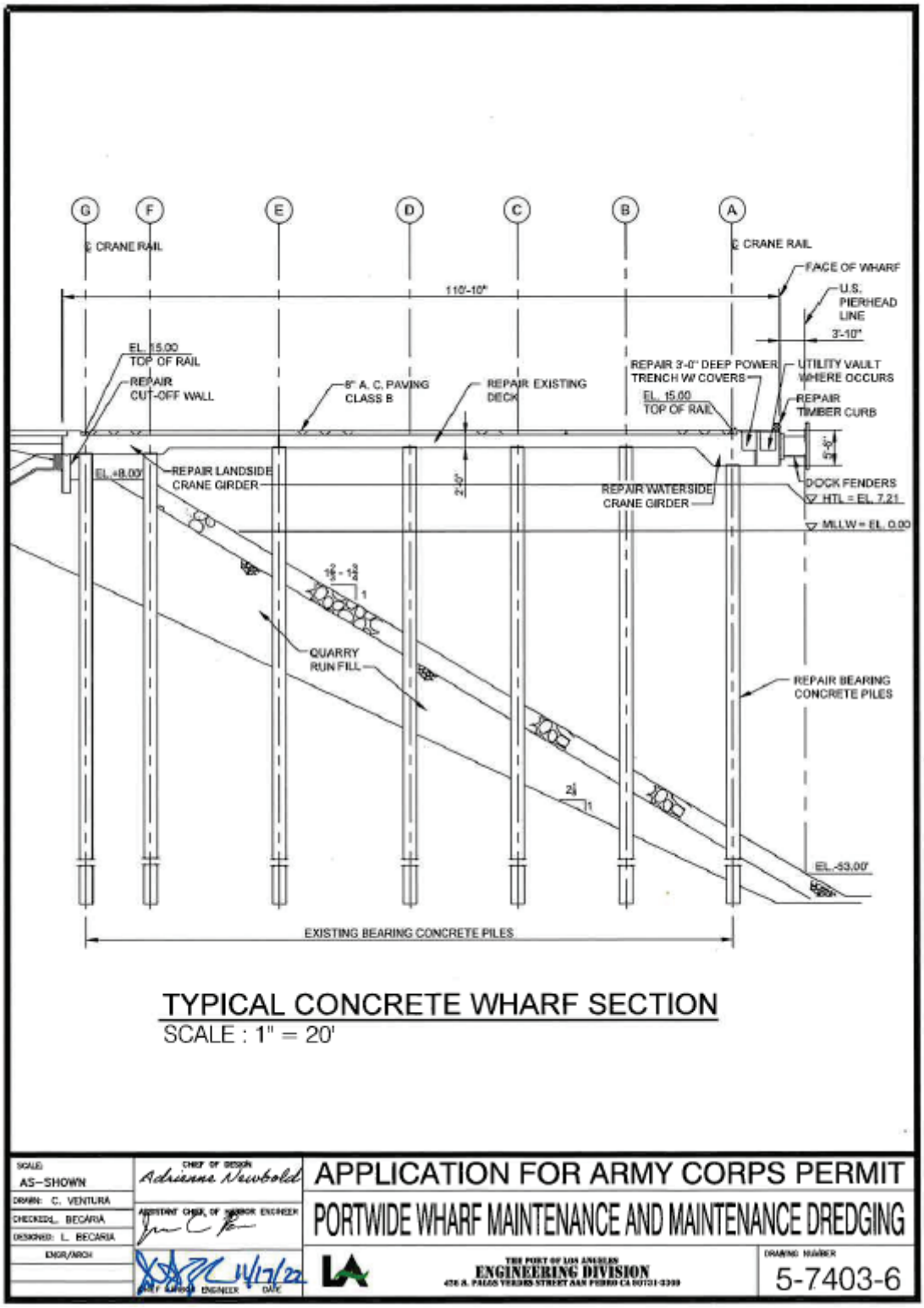
[1]

[1] Port of Los Angeles Typical Timber Wharf Cross Section



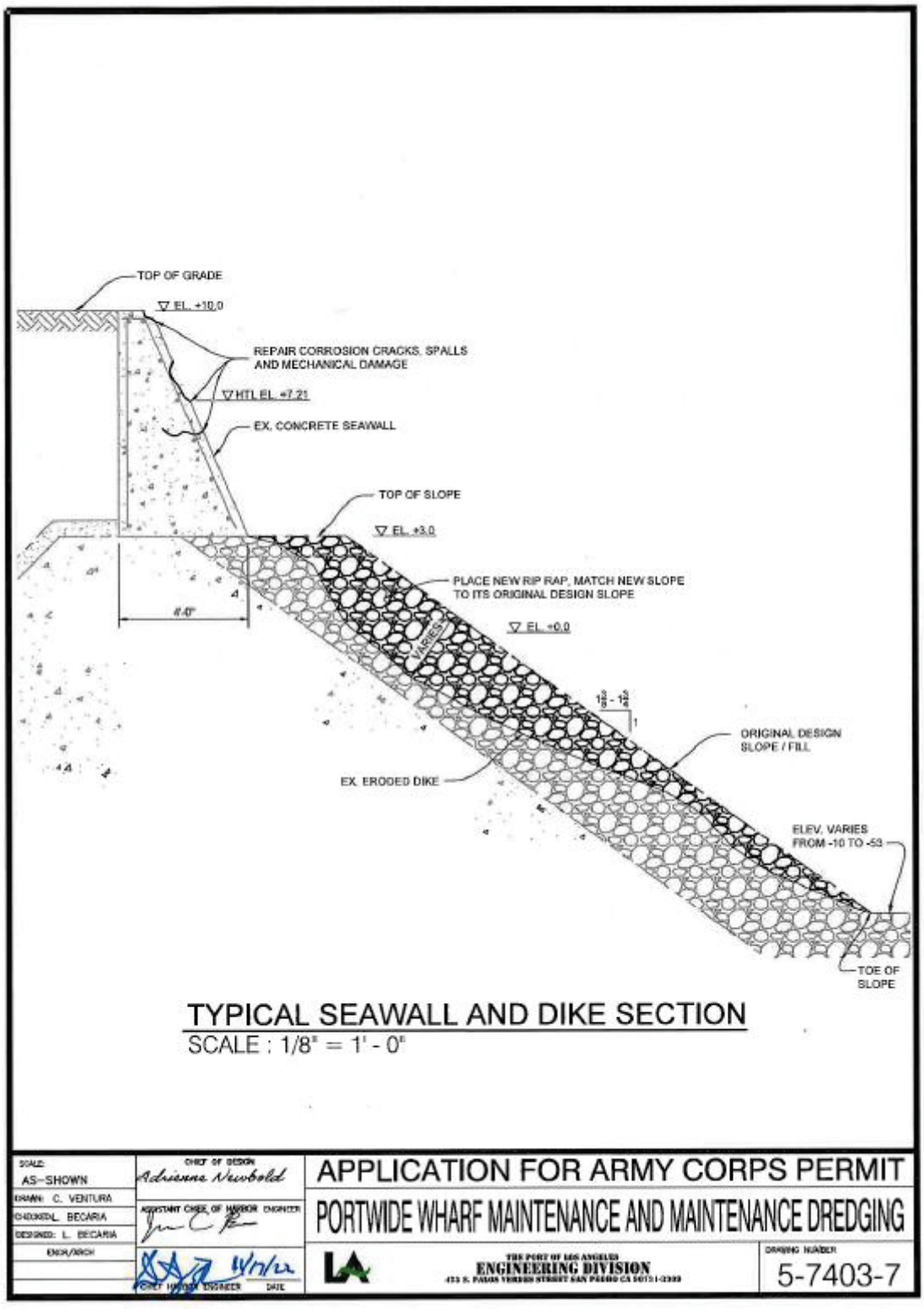
[1]

[1] Port of Los Angeles Typical Fender Pile at Concrete Wharf Cross Section



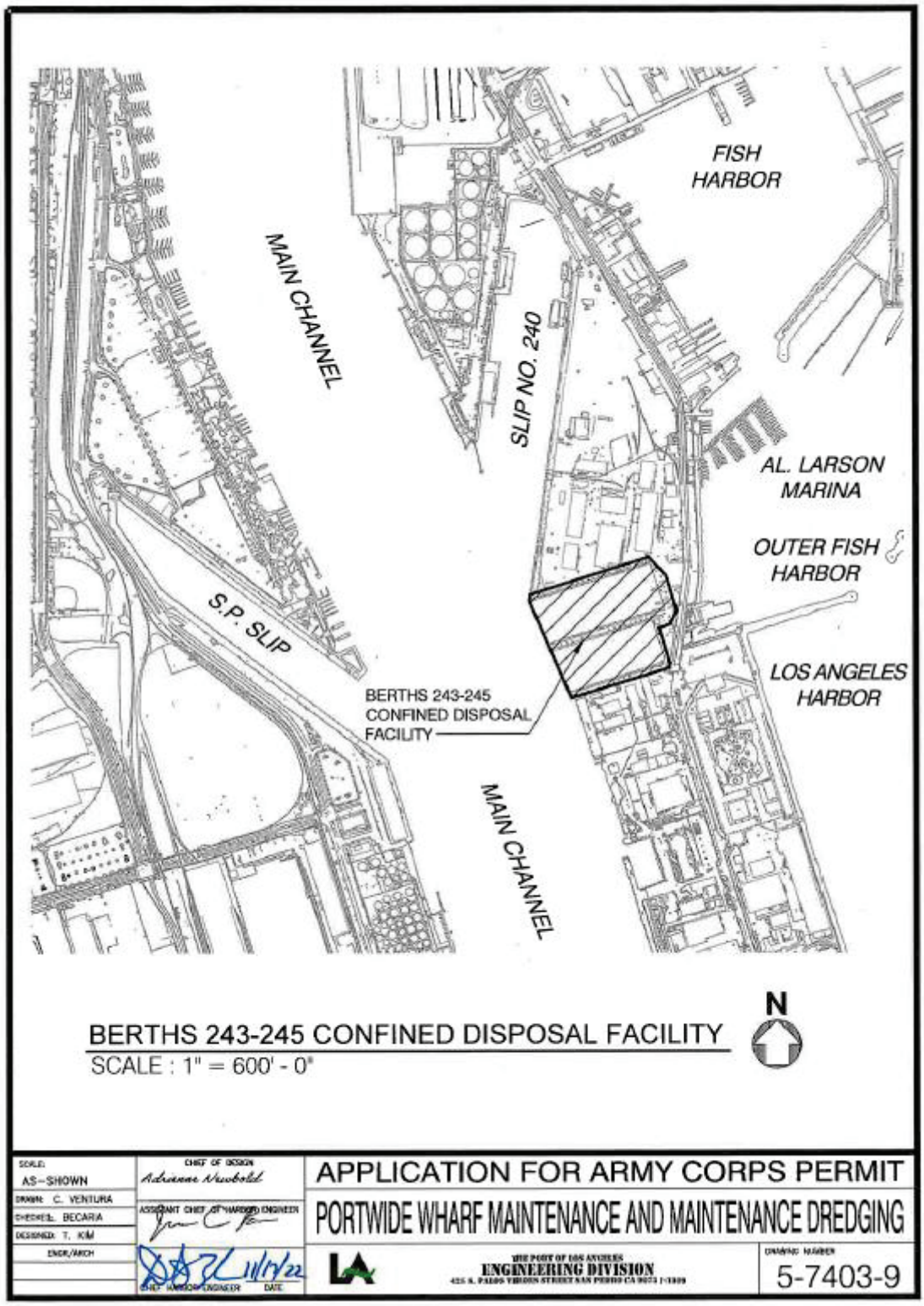
[1]

[1] Port of Los Angeles Typical Concrete Wharf Cross Section



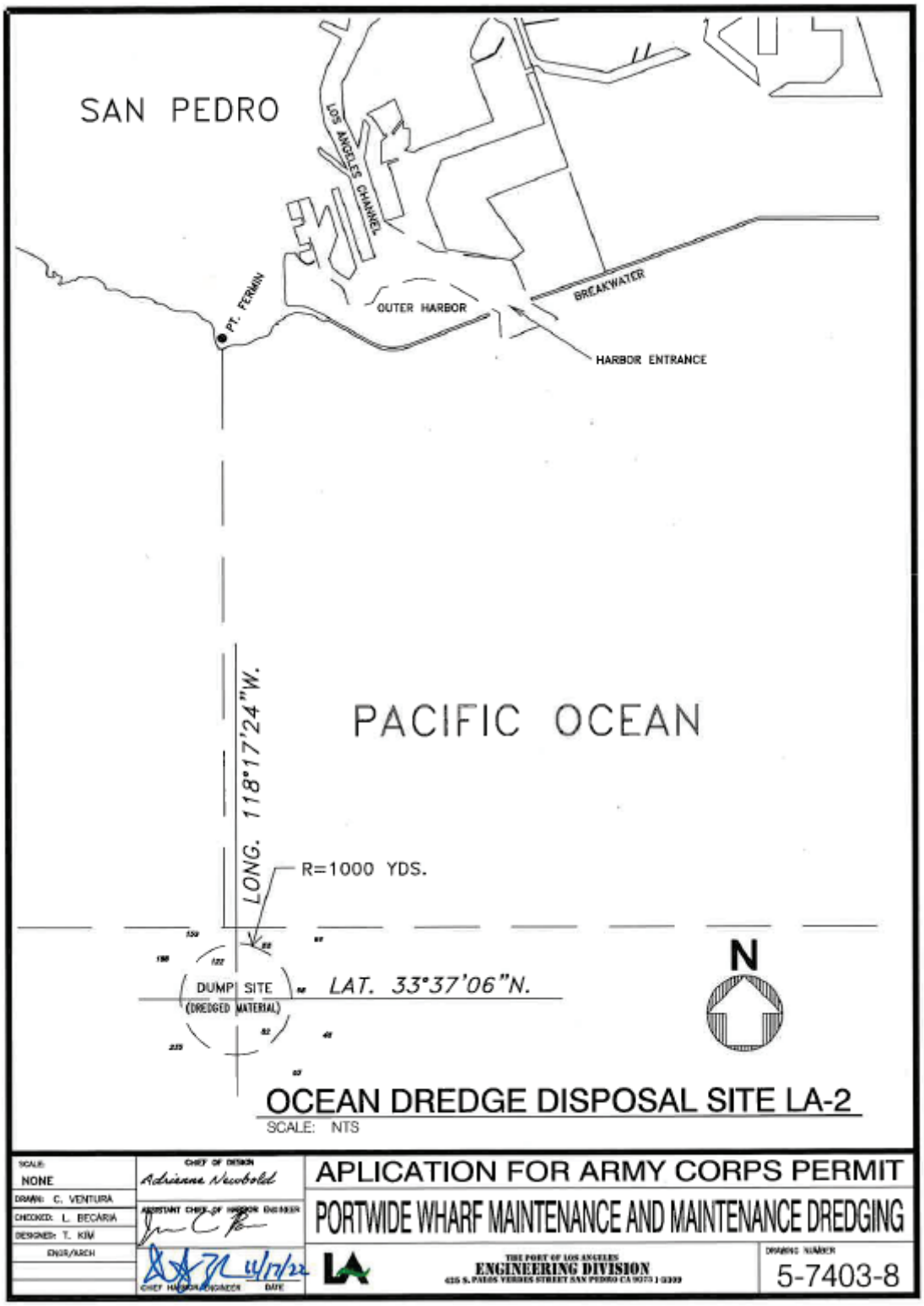
[1]

[1] Port of Los Angeles Typical Seawall and Dike Cross Section



[1]

[1] Port of Los Angeles Berths 243-245 Confined Disposal Facility



[1]

[1] U.S. EPA Ocean Dredge Material Disposal Site LA-2 Location Map (latitude: 33 degrees 37 minutes 06 seconds North / longitude: -118 degrees 17 minutes 24 seconds West)

Los Angeles Regional Water Quality Control Board

CLEAN WATER ACT SECTION 401 WATER QUALITY CERTIFICATION AND ORDER

Effective Date: September 19, 2023

Program Type: Dredging and Fill/Excavation

Regulatory Measure ID:	452165
Place ID:	887519
WDID:	4WQC40123078
USACOE#:	SPL-2022-00686
R4 File No:	23-078

Project Type: Boating and Navigation

Project: Port of Los Angeles Wharf Maintenance and Maintenance Dredging (Project)

Applicant: Port of Los Angeles

Applicant Contact:
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Chief Harbor Engineer
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Applicant's Agent:
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Email: lbecaria@portla.org

Water Board Staff:
Emily Duncan
Senior Environmental Scientist
320 W. 4th Street, Suite 200
Los Angeles, CA 90013
Phone: 213-576-6679
Email: Emily.Duncan@waterboards.ca.gov

Water Board Contact Person:
If you have any questions, please call the Los Angeles Regional Water Quality Control Board (Los Angeles Water Board) Staff listed above or (213) 576-6600 and ask to speak with the Water Quality Certification and Wetlands Unit Program Manager. When corresponding via email, please include our general email: RB4-401Certification@waterboards.ca.gov.

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Attachment B Signatory Requirements
Attachment C Report and Notification Requirements
Attachment D 40 CFR Part 121.7 Compliance
Attachment E Locations where maintenance repair activities may be conducted

I. Order

This Clean Water Act (CWA) section 401 Water Quality Certification action and Order (Order) is issued at the request of Dina Aryan-Zahlan and the Port of Los Angeles (hereinafter Permittee) for the Project. This Order is for the purpose described in the application and supplemental information submitted by the Permittee. The application was received on April 5, 2023. The application was deemed complete on June 21, 2023.

The Applicant submitted a certification request as defined by 40 CFR section 121.5 concurrently to the Los Angeles Water Board and the U.S. Army Corps of Engineers (Corps) on April 5, 2023. In response to the certification request, the Corps provided a reasonable period of time as defined by 40 CFR 121.6 for the Water Board to act on the request by September 19, 2023.

II. Public Notice

The Los Angeles Water Board provided public notice of the application pursuant to California Code of Regulations, title 23, section 3858 from April 7, 2023 to the effective date of the Order. The Los Angeles Water Board did not receive any comments during the comment period.

III. Project Purpose

The purpose of the Project is threefold 1) to maintain the navigable capacity of waterways within the Port; 2) to facilitate routine, in-kind maintenance of marine structures (e.g. wharves, dikes, and bulkheads); and 3) to beneficially reuse dredged sediment when appropriate.

IV. Project Description

The Port of Los Angeles has previously been authorized maintenance dredging under Order No. R4-2018-0139 (File No. 16-135) and maintenance wharf repairs under CWA section 401 Water Quality Certification, 4WQC40117135 (File No. 17-135). The maintenance dredging permit allowed for up to 150,000 cubic yards (cy) of sediment annually, not to exceed 750,000 cy over the 5-year period. The wharf repairs permit allowed for structural maintenance and repair activities within the harbor for all berths and areas listed in the certification. This certification will authorize POLA to conduct both activities (dredging and wharf repairs) in one 10-year certification.

Maintenance Dredging

The Port of Los Angeles will dredge up to a maximum of 150,000 cubic yards per calendar year for a total maximum volume of 1,500,000 cubic yards over a 10-year period from all the berth areas in the Los Angeles Harbor that may require maintenance. Dredging will be accomplished through use of a clamshell dredge (barge mounted, or by bucket from the shore or wharf) and knockdown dredging.

The disposal options for each dredging project will be dictated by the quality of the dredged material as indicated by a sediment characterization study and will be determined by the Southern California Dredged Material Management Team (SCDMMT), which includes, but is not limited to, the Los Angeles Water Board, the California Coastal Commission, the USEPA and the Corps. A sediment characterization study typically consists of sediment sample collection, grain size analysis, chemical analysis (including sediment chemistry, tissue chemistry and elutriate testing), and biological testing (including solid and suspended particulate phase toxicity testing, and bioaccumulation potential analysis) as outlined in regulatory guidance documents, such as *Evaluation of Dredged Material Proposed for Ocean disposal,* also known as the “Green Book” (USEPA and USACE, 1991) and the *Inland Testing Manual* (USEPA and USACE, 1998). However, the requirements for specific analysis or testing are usually driven by the proposed disposal option. For example, biological testing is

normally required when the dredged material is proposed to be disposed of at an ocean disposal site, a temporary aquatic storage site, or a confined aquatic disposal (CAD) site. If the dredged material is deemed suitable for ocean disposal, the material will be disposed of at the offshore LA-2 ocean disposal site. The LA-2 ocean disposal site is a USEPA designated site that is currently managed at an annual disposal capacity of 1 million cubic yards for the ocean disposal of dredged material from the Los Angeles County and Orange County regions. The site is located approximately 6.8 miles offshore from the entrance to the Port of Los Angeles in federal waters. If the dredged material is deemed unsuitable for ocean disposal, the material will be disposed of within the Berths 243-245 Confirmed Disposal Facility (CDF) located within Los Angeles Harbor, or at another suitable land disposal site deemed appropriate by the SCDMMT. Maintenance dredge materials in the Los Angeles Harbor are typically composed of fine silts and clays, with generally no more than 25% sand. However, should testing indicate that the dredged material is composed of at least 80% sand and deemed suitable to beach nourishment, the material will be disposed of at Outer Cabrillo Beach as another disposal option.

The Port of Los Angeles will conduct a sediment characterization study prior to proposed maintenance dredging operations for evaluation of the suitability of the material for beneficial re-use and selection of a suitable disposal alternative. A sampling and Analysis Plan (SAP) for each sediment characterization study will be submitted to the SCDMMT for approval. A Sampling and Analysis Report (SAR) for each sediment characterization study will be presented to and discussed at the SCDMMT meetings, where the disposal options of the dredged material will be determined. The Port of Los Angeles shall submit all documents to the Los Angeles Water Board for staff review prior to each dredging event.

The Port of Los Angeles may use ‘knockdown’ dredging to supplement routine maintenance dredging. Within the port, there are times when the prop wash from the large propellers of commercial vessels creates isolated high spots near the berths. These localized high spots usually consist of less than one to two feet of accumulated sediment, often very close to the edge of the wharf and spread over a wide area. To address these localized high spots, “knockdown” dredging is a commonly used. It involves the leveling or spreading of shoaled or mounded material to maintain waterway depths, rather than the direct removal of material from the waterway. This activity typically involves employing an I-beam or other similar equipment which is towed by a boat across a shoal or mound in order to redistribute the sediment into adjacent deeper areas within the project area. This equipment can be mobilized more quickly and much more inexpensively than normal dredging equipment. The option to use “knockdown” dredging or grading of underwater shoals to supplement routine maintenance dredging activities would provide the Port of Los Angeles with a more efficient, cost-effective means to deal with localized shoaling events while maintaining the safe navigation and berthing of vessels.

In addition to using a drag beam- an I-beam, rake, cutting edge, or similar fixed object, the Port of Los Angeles may use another “knockdown” dredging technique using a clamshell bucket or excavator to sweep the bottom surface to knock down high spots. This method would be used to remove high spots near piles or other wharf structures where the use of a drag beam is not feasible. A clamshell bucket, excavator or similar equipment also may be used to collect and move shoaled material near the bottom (without lifting out of the water column) for placement in a lower nearby area within the approved project boundary.

Small knockdowns can reduce the need for and frequency of maintenance dredging and may have fewer environmental effects than traditional dredging (less turbidity is produced by knockdowns,

since sediments remain localized near the bottom, rather than being raised through the water column and removed at the surface as is the cased with dredging, which can generate large turbidity plumes). In addition, since the knockdown process simply redistributes shoaled or mounded material within the normal dredging footprint of a berth, the material would be removed in the future when full dredging is required.

The Port of Los Angeles will also conduct a pre-knockdown study prior to each knockdown dredging operation to assess the quality of the sediments. A SAP for each pre-knockdown study will be submitted to the SCDMMT for approval. For each pre-knockdown study, the Port of Los Angeles proposes to collect one sample per 500 linear feet of knockdown area along a wharf face and per 250 feet offshore. Elutriate testing will be performed for each sample. A SAR for each pre-knockdown study will also be presented to and discussed at the SCDMMT monthly meetings, where the scope of the knockdown operation will be approved. No receiving water monitoring will be required during knockdown dredging since the limited magnitude (less than 2000 cubic yards) and short duration of the activity is not expected to produce adverse water quality impacts. The Port of Los Angeles has proposed several criteria and guidelines that must be met to use “knockdown” dredging: 1) limited to a maximum of 15,000 cubic yards of material per year; 2) total volume for each event limited to a maximum of 2,000 cubic yards; and 3) cannot be performed in the same area more than once per year. POLA shall submit documents to the Los Angeles Water Board for staff review and written approval for each knockdown dredging project.

Wharf Maintenance

Wharf maintenance includes scheduled repair, emergency repair, and routine maintenance of existing timber and concrete wharves. Specifically, it includes in-kind replacement of decking, joists, pile caps, marginal beams, bull rails, pile wraps, deteriorated bearing piles made of concrete, timber or steel, fender piles, and other wharf structural members that are damaged and require repair or replacement. Creosote piles will typically be replaced with Ammoniacal Coper Zinc Arsenate (ACZA) treated timber piles. Creosote-treated pilings shall not be placed within the Port of Los Angeles unless all of the following conditions are met: 1) the project involves the repair of existing structures that were originally constructed using wood products; 2) the creosote-treated pilings are wrapped in plastic; 3) measures are taken to prevent damage to plastic wrapping from boat use. Such measures may include installation of rub strips or bumpers; 4) the plastic wrapping is sealed at all joints to prevent leakage; and 5) the plastic material is expected to maintain its integrity for at least ten years, and plastic wrappings that develop holes or leaks must be repaired or replaced in a timely manner by the permittee.

Also, the wharf maintenance program includes the repair of damaged seawalls to the original condition and restoration of eroded revetment or rock dike by placing new, clean riprap over existing eroded dike in order to stabilize or protect existing dike. The slope of the new fill will match the original design slope and elevations.

Repairs will be conducted as the need arises. Based on previous wharf maintenance, it is estimated that the maximum cumulative project area will be approximately 14.96 acres. This area was calculated by calculating the average in-water work area next to the wharf (0.17 acres) and multiplying that by the number of projects in 10 years (88 projects). The area also includes the project area of possible dike and seawall repairs that may be performed over the water.

V. Project Location

The project is located in the Port of Los Angeles. Maps and Figures showing the Project location are found in Attachment A of this Order. Specific locations within the Port of Los Angeles where maintenance may be conducted are listed in Attachment E of this Order.

VI. Project Impact and Receiving Waters Information

The Project is located within the jurisdiction of the Los Angeles Water Board. Receiving waters and groundwater potentially impacted by this Project are protected in accordance with the applicable water quality control plan (Basin Plan) for the region and other plans and policies which may be accessed online at: http://www.waterboards.ca.gov/plans_policies/. The Basin Plan includes water quality standards, which consist of existing and potential beneficial uses of waters of the state, water quality objectives to protect those uses, and the state and federal antidegradation policies.

It is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This Order promotes that policy by requiring discharges to meet contaminant levels designed to protect human health and ensure that water is safe for domestic use.

Receiving Water:	Los Angeles – Long Beach Harbors: Outer Harbor and All Other Inner Areas (Hydrologic Unit Code: 180701060703)
Designated Beneficial Uses:	IND, NAV, POW, REC-1, REC-2, COMM, MAR, RARE, SHELL

VII. Description of Direct Impacts to Waters of the State

Total Project dredge and fill/excavation quantities for all impacts are summarized in Tables 1 and 2. Permanent impacts are categorized as those resulting in a physical loss in area and also those degrading ecological condition only.

Table 1: Total Project Dredge Quantity

Aquatic Resource Type	Temporary Impact[1]			Permanent Impact					
				Physical Loss of Area			Degradation of Ecological Condition Only		
	Acres	CY[2]	LF	Acres	CY	LF	Acres	CY	LF
Ocean/bay/ estuary		150,000 per year							

Table 2: Total Project Fill/Excavation Quantity

Aquatic	Temporary Impact[3]	Permanent Impact

[1] Includes only temporary direct impacts to waters of the state and does not include upland areas of temporary disturbance which could result in a discharge to waters of the state. Temporary impacts, by definition, are restored to pre-project conditions and therefore do not include a physical loss of area or degradation of ecological condition.

[2] Cubic Yards (CY); Linear Feet (LF)

Table 2: Total Project Fill/Excavation Quantity									
Resource Type				Physical Loss of Area			Degradation of Ecological Condition Only		
	Acres	CY[4]	LF	Acres	CY	LF	Acres	CY	LF
Ocean/bay/ estuary	14.96								

VIII. Avoidance and Minimization

No alternatives analysis is required because the Project has no permanent impacts to aquatic resources and no impacts to rare, threatened or endangered species habitat in waters of the state, wetlands, eelgrass beds, Outstanding National Resources Waters or Areas of Special Biological Significance.

IX. Compensatory Mitigation

No compensatory mitigation was required for impacts because all impacts are temporary in nature and are for routine maintenance activities.

If eelgrass is detected in a survey conducted prior to dredging and/or maintenance activities impacts to eelgrass shall be mitigated in accordance with the California Eelgrass Mitigation Policy (CEMP).

X. California Environmental Quality Act (CEQA)

The Los Angeles Water Board has determined that the Project is exempt from review under CEQA pursuant to California Water Code of Regulations, title 14, section 15061. Specifically, the issuance of this Order and the activities described herein meet the exemption criteria under California Code of Regulations title 14, section(s) 15301 existing facilities, 15302 replacement or reconstruction, or 15304, minor alterations to land. Additionally, the Los Angeles Water Board concludes that no exceptions to the CEQA exemption apply to the activities approved by this Order.

XI. Petitions for Reconsideration

Any person aggrieved by this action may petition the State Water Board to reconsider this Order in accordance with California Code of Regulations, title 23, section 3867. A petition for reconsideration must be submitted in writing and received within 30 calendar days of the issuance of this Order.

XII. Fees Received

The fee amount for the proposed project has been determined as required by California Code of Regulations, title 23, sections 3833(b)(3) and 2200(a)(3), and was calculated as Fill and Excavation Discharges and Dredging Discharges, with the dredge and fill fee calculator.

(footnote continued from previous page)

[3] Includes only temporary direct impacts to waters of the state and does not include upland areas of temporary disturbance which could result in a discharge to waters of the state.

[4] Cubic Yards (CY); Linear Feet (LF)

Table 3: Record of Fees Received		
Date Received	**Check No.**	**Amount**
June 2, 2023	**0301283094**	**$2,734.00**
		$234,456 (not received at time of Order issuance)
	Total	

XIII. Findings

1. This Order is adopted pursuant to section 401 of the Clean Water Act and the California Porter-Cologne Water Quality Control Act (Cal. Water Code § § 13000, et seq.). Discharges to waters of the state are prohibited except when in accordance with Water Code section 13264. Notwithstanding any determinations made by the U.S. Army Corps or other federal agency pursuant to 40 C.F.R. section 121.9, dischargers must comply with the entirety of this Order because the Order also serves as waste discharge requirements in accordance with State Water Board Water Quality General Order No. 2003-0017-DWQ.

2. Failure to comply with any condition of this Order shall constitute a violation of the Porter-Cologne Water Quality Control and the Clean Water Act. The Permittee and/or discharger may then be subject to administrative and/or civil liability pursuant to Water Code section 13385.

3. In the event of any violation or threatened violation of the conditions of this Order, the violation or threatened violation shall be subject to any remedies, penalties, process, or sanctions as provided for under state and federal law.

4. In response to a suspected violation of any condition of this Order, the Water Board may require the holder of this Order to furnish, under penalty of perjury, any technical or monitoring reports the Water Boards deem appropriate, provided that the burden, including costs, of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. The additional monitoring requirements ensure that permitted discharges and activities comport with any applicable effluent limitations, water quality standards, and/or other appropriate requirement of state law.

5. This Order and all of its conditions contained herein continue to have full force and effect regardless of the expiration or revocation of any federal license or permit issued for the Project.

6. This Order does not provide coverage under the Construction General Permit. As applicable, dischargers shall maintain compliance with conditions described in, and required by, the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-009-DWQ; NPDES No. CAS000002 as amended by Order No. 2010-0014-DWQ, Order No. 2012-0006-DWQ, and any amendments thereto) (General Construction Permit). Enrollment in the Construction General Permit may be required for construction activity resulting in a land disturbance of one acre or more, or less than one acre but part of a larger common plan of development or sale. For projects with ground disturbing activities that require enrollment in the Construction General Permit, dischargers shall maintain compliance with conditions described in, and required by the Permit. For ground disturbing activities that do

not require enrollment in Order No. 2009-0009-DWQ, project plans included with the application shall include appropriate erosion and sediment control measures as described in the *Best Management Practices* Section (Stormwater subsection) below.

7. This Order does not authorize any act which results in the taking of a threatened, endangered or candidate species or any act, which is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish & Wildlife Code, sections 2050-2097) or the federal Endangered Species Act (16 U.S.C. sections 1531-1544). If a "take" will result from any act authorized under this Order held by the discharger, the discharger must obtain authorization for the take prior to any construction or operation of the portion of the Project that may result in a take. The discharger is responsible for meeting all requirements of the applicable endangered species act for the Project authorized under this Order.

8. This Order includes monitoring and reporting requirements pursuant to Water Code section 13267. The burden of preparing these reports, including costs, are reasonable to the need and benefits of obtaining the reports. The reports confirm that the best management practices required under this Order are sufficient to protect beneficial uses and water quality objectives. The reports related to accidental discharges also ensure that corrective actions, if any, that are necessary to minimize the impact or clean up such discharges can be taken as soon as possible. The anticipated costs are minimal as the reporting obligations require only visual monitoring, in-field measurements, and notification reporting.

XIV. Conditions

The Los Angeles Water Board has independently reviewed the record of the Project to analyze impacts to water quality and designated beneficial uses within the watershed of the Project. In accordance with this Order, the Permittee may proceed with the Project under the following terms and conditions. This Order provides reasonable assurance that the Project authorized under this Order will comply with state and federally approved water quality requirements, provided that the following conditions are adhered to.

A. Authorization

Impacts to waters of the state shall not exceed quantities shown in Tables 1 and 2.

B. Reporting and Notification Requirements

Requirements for the content of these reporting and notification types are detailed in Attachment C, including specifications for photo and map documentation during the Project. Written reports and notifications must be submitted using the Reporting and Notification Cover Sheet located in Attachment C, which must be signed by the Permittee or an authorized representative.

1. Project Reporting

a. Annual Reporting: The Permittee shall submit an Annual Report each year by December 31st. Annual Reporting requirements are detailed in Attachment C. Annual reporting shall continue until a Notice of Project Complete Letter is issued to the Permittee.

2. Project Status Notifications

a. Commencement of Construction: The Permittee shall submit a Commencement of Construction Report at least seven (7) days prior to start of initial ground disturbance activities.

b. Notice of Completion of an Eelgrass Survey: The Permittee shall submit an eelgrass survey per the California Eelgrass Mitigation Policy (CEMP) that will be conducted at a maximum of sixty (60) days prior to the commencement of in water construction activities. The survey will be reviewed by Los Angeles Water Board staff within two weeks following submission. The Permittee shall not begin construction before approval of the eelgrass survey by the Los Angeles Regional Water Board.

c. Request for Notice of Completion of Discharges Letter: The Permittee shall submit a Request for Notice of Completion of Discharges Letter following completion of active Project construction activities, including any required restoration and permittee-responsible mitigation. This request shall be submitted to Los Angeles Water Board staff within thirty (30) days following completion of all Project construction activities. Upon acceptance of the request, Los Angeles Water Board staff shall issue a Notice of Completion of Discharges Letter to the Permittee, which will end the active discharge period and associated annual fees.

d. Request for Notice of Project Complete Letter: The Permittee shall submit a Request for Notice of Project Complete Letter when construction and/or any post-construction monitoring is complete,[5] and no further Project activities will occur. This request shall be submitted to Los Angeles Water Board staff within thirty (30) days following completion of all Project activities. Upon approval of the request, Los Angeles Water Board staff shall issue a Notice of Project Complete Letter to the Permittee which will end the post discharge monitoring period and associated annual fees.

3. Conditional Notifications and Reports: The following notifications and reports are required as appropriate.

a. Accidental Discharges of Hazardous Materials[6]

Following an accidental discharge of a reportable quantity of a hazardous material, sewage, or an unknown material, the following applies (Wat. Code, § 13271):

i. As soon as (A) the Permittee has knowledge of the discharge or noncompliance, (B) notification is possible, and (C) notification can be provided without substantially impeding cleanup or other emergency measures then:
- first call – 911 (to notify local response agency)
- then call – Office of Emergency Services (OES) State Warning Center at:

[5] Completion of post-construction monitoring shall be determined by Los Angeles Water Board staff and shall be contingent on successful attainment of restoration and mitigation performance criteria.

[6] "Hazardous material" means any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment. (Health & Saf. Code, § 25501.)

(800) 852-7550 or (916) 845-8911
Lastly, follow the required OES procedures as set forth in the Office of Emergency Services' Accidental Discharge Notification Web Page (https://www.caloes.ca.gov/office-of-the-director/operations/response-operations/fire-rescue/hazardous-materials/spill-release-reporting/)

ii. Following notification to OES, the Permittee shall notify the Los Angeles Water Board, as soon as practicable (ideally within 24 hours). Notification may be via telephone, e-mail, or delivered written notice.

iii. Within five (5) working days of notification to the Los Angeles Water Board, the Permittee must submit an Accidental Discharge of Hazardous Material Report.

b. Violation of Compliance with Water Quality Standards: The Permittee shall notify the Los Angeles Water Board of any event causing a violation of compliance with water quality standards. Notification may be via telephone, e-mail, or delivered written notice.

i. Examples of noncompliance events include: lack of any reporting in a timely manner, lack of storm water treatment following a rain event, discharges causing a visible plume in a water of the state, water contact with uncured concrete, and exceedances of limits for the analytes for *In-Water Work or Diversions* listed below.

ii. This notification must be followed within three (3) working days by submission of a Violation of Compliance with Water Quality Standards Report.

c. In-Water Work or Diversion

i. During in-water work, water quality monitoring shall be conducted. Requirements for water quality monitoring are below.

d. Modifications to Project: Project modifications may require an amendment of this Order. The Permittee shall give advance notice to Los Angeles Water Board staff if Project implementation as described in the application materials is altered in any way or by the imposition of subsequent permit conditions by any local, state or federal regulatory authority by submitting a Modifications to Project Report. The Permittee shall inform Los Angeles Water Board staff of any Project modifications that will interfere with the Permittee's compliance with this Order.

e. Transfer of Property Ownership: This Order is not transferable in its entirety or in part to any person or organization except after receiving certification for the Project from the Los Angeles Water Board. In addition:

i. The Permittee must notify the Los Angeles Water Board of any change in ownership or interest in ownership of the Project area by submitting a Transfer of Property Ownership Report. The Permittee and purchaser must sign and date the notification and provide such notification to the Los Angeles Water Board at least 30 days prior to the transfer of ownership.

ii. Until such time as a new Order has been issued, the Permittee shall continue to be responsible for all requirements set forth in this Order.

f. Transfer of Long-Term BMP Maintenance: If maintenance responsibility for post-construction BMPs such as debris basins is legally transferred, the Permittee must submit to the Los Angeles Water Board a copy of such documentation and must provide the transferee with a copy of a long-term BMP maintenance plan that complies with manufacturer or designer specifications. The Permittee must provide such notification to the Los Angeles Water Board with a Transfer of Long-Term BMP Maintenance Report at least 10 days prior to the transfer of BMP maintenance responsibility.

C. Water Quality Monitoring

1. **General:** If surface water is present, continuous visual surface water monitoring shall be conducted to detect accidental discharge of construction related pollutants (e.g., oil and grease, turbidity plume, or uncured concrete).

2. **Accidental Discharges/Noncompliance:** Upon occurrence of an accidental discharge of hazardous materials or a violation of compliance with a water quality standard, Los Angeles Water Board staff may require water quality monitoring based on the discharge constituents and/or related water quality objectives and beneficial uses.

3. **In-Water Work or Diversions:**

   During planned work in water, any discharge(s) to waters of the state shall conform to the following water quality standards:

   a. Oil and Grease. Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses.

   b. Dissolved Oxygen. At a minimum, the mean annual dissolved oxygen concentration of all waters shall be greater than 7 mg/L, and no single determination shall be less than 5.0 mg/L, except when natural conditions cause lesser concentrations.

   For that area known as the Outer Harbor area of Los Angeles-Long Beach Harbors, the mean annual dissolved oxygen concentrations shall be 6.0 mg/L or greater, provided that no single determination shall be less than 5.0 mg/L

   c. pH. The pH of bays or estuaries shall not be depressed below 6.5 or raised above 8.5 as a result of waste discharges. Ambient pH levels shall not be changed more than 0.2 units from natural conditions as a result of waste discharge.

   d. Turbidity. Downstream TSS shall be maintained at ambient levels. Where natural turbidity is between 0 and 50 Nephelometric Turbidity Units (NTU), increases shall not exceed 20%. Where natural turbidity is greater than 50 NTU, increases shall not exceed 10%.

Water quality monitoring is required for all maintenance dredging projects and wharf maintenance projects involving the removal or replacement of 10 or more piles. Sampling shall be conducted in accordance with Table 4 sampling parameters.[7]

Table 4: Sample Type and Frequency Requirements

Parameter	Unit of Measurement	Type of Sample	Minimum Frequency
Oil and Grease	N/A	Visual	Continuous
Dissolved Oxygen	mg/L	Grab or CTD	Daily for the first week, weekly, thereafter
pH	Standard Units	Grab or CTD	Daily for the first week, weekly, thereafter
Turbidity	% light transmittance	Grab or CTD	Daily for the first week, weekly, thereafter
Temperature	°F (or as °C)	Grab or CTD	Daily for the first week, weekly, thereafter

A reference station shall be established outside of the project influence, at least 300 feet from the Project Boundary. The Reference station is to be monitored concurrently with project station monitoring. Project station sampling shall take place at a minimum of two locations. Project station data will be compared to reference station data to determine compliance for water quality parameters (4 locations total). Results of the analyses shall be submitted to this Regional Board by the 15th day of each subsequent sampling month. A map or drawing indicating the locations of sampling points shall be included with each submittal. A summary of results shall discuss the analysis and compliance. Every measurement not meeting the compliance limits shall be accompanied by an explanation, the actions taken to correct the degradation to waters, and addressed in *Violation of Compliance with Water Quality Standards* report described above.

D. Standard Conditions

1. This Order is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to Water Code section 13330, and California Code of Regulations, title 23, chapter 28, Article 6 commencing with sections 3867-3869, inclusive. Additionally, the Los Angeles Water Board reserves the right to suspend, cancel, or modify and reissue this Order, after providing notice to the Permittee, if the Los Angeles Water Board determines that: the Project fails to comply with any of the conditions of this Order; or, when necessary to implement any new or revised water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act (Wat. Code, §

[7] Pollutants shall be analyzed using the analytical methods described in 40 Code of Federal Regulations Part 136; where no methods are specified for a given pollutant, the method shall be approved by Los Angeles Water Board staff. Grab samples shall be taken between the surface and mid-depth and not be collected at the same time each day to get a complete representation of variations in the receiving water. Measurements with a Conductivity, Temperature and Depth (CTD) tool shall be taken throughout the water column, at a minimum of 2-meter increments An average of surface to mid-depth readings shall be reported. A hand-held field meter may be used, provided the meter utilizes a U.S. EPA-approved algorithm/method and is calibrated and maintained in accordance with the manufacturer's instructions. A calibration and maintenance log for each meter used for monitoring shall be maintained onsite.

13000 et seq.) or federal Clean Water Act section 303 (33 U.S.C. § 1313). For purposes of Clean Water Act section 401(d), the condition constitutes a limitation necessary to assure compliance with water quality standards and appropriate requirements of state law.

2. This Order is not intended and shall not be construed to apply to any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license, unless the pertinent certification application was filed pursuant to subsection 3855(b) of chapter 28, title 23 of the California Code of Regulations, and that application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

3. This Order is conditioned upon total payment of any fee required under title 23 of the California Code of Regulations and owed by the Permittee.

E. General Compliance

1. Permitted actions must not cause a violation of any applicable water quality standards, including impairment of designated beneficial uses for receiving waters as adopted in the Basin Plans by any applicable Los Angeles Water Board or any applicable State Water Board (collectively Water Boards) water quality control plan or policy. The source of any such discharge must be eliminated as soon as practicable.

2. Authorization under this Order is granted based on the application information submitted, including engineering plans, specifications, and technical reports. Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order.

F. Administrative

1. Signatory requirements for all document submittals required by this Order are presented in Attachment B of this Order.

2. The Permittee shall grant Los Angeles Water Board staff, or an authorized representative (including an authorized contractor acting as a Water Board representative), upon presentation of credentials and other documents as may be required by law, permission to:

    1. Enter upon the Project or compensatory mitigation site(s) premises where a regulated facility or activity is located or conducted, or where records are kept.
    2. Have access to and copy any records that are kept and are relevant to the Project or the requirements of this Order.
    3. Inspect any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order.
    4. Sample or monitor for the purposes of assuring Order compliance.

3. A copy of this Order shall be provided to any consultants, contractors, and subcontractors working on the Project. Copies of this Order shall remain at the Project site for the duration of this Order. The Permittee shall be responsible for work conducted by its consultants, contractors, and any subcontractors.

4. A copy of this Order must be available at the Project site(s) during construction for review by site personnel and agencies. All personnel performing work on the Project shall be familiar with the content of this Order and its posted location at the Project site.

5. This Order shall expire ten (10) years from date of this Order. The Applicant shall submit a complete application at least 90 days prior to termination of this Order if renewal is requested.

G. Best Management Practices

1. Dredging

a. BMPs shall be implemented to minimize the suspension of sediments and disturbance of the substrate when performing maintenance dredging and structure maintenance. Appropriate BMPs shall be implemented for individual maintenance projects and could include measures such as use of silt curtains and floating booms, adjustment of dredge bucket cycle time, preventing overflow of sediment from barges, avoiding overdredging, and containing and removing construction debris from the project area promptly.

b. Sediments shall be sampled and analyzed prior to dredging activities and presented to the Southern California Dredged Material Management Team to determine the suitability of the proposed placement site.

2. Site Management

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.

b. Concrete waste shall be retained on-site until they can be appropriately disposed or recycled.

c. On-site washout shall be allowed only in designated areas away from drains, ditches, and streets.

d. Trash and construction-related solid waste shall be deposited in covered receptacles.

e. Tracking of sediment and other materials from the site by vehicle traffic shall be prevented.

f. Construction entrance roadways shall be stabilized to inhibit sediments from being deposited into the public ways.

g. Non-storm water runoff from equipment and vehicle washing and any other activity shall be contained at the Project site.

h. Containment booms shall be installed within the construction area during removal of existing decking, piles and other structural members.

3. Hazardous Materials

a. BMPs shall be implemented for the placement of creosote treated piles, including wrapping them in plastic.

4. In-Water Work

a. In water sound level monitoring shall be conducted during pile driving of steel piles.

b. A vibratory hammer shall be used to the maximum extent feasible with impact hammers used only if required for final pile driving.

c. Hydrojet installation of piles shall only be used in specific situations, these situations may include repairs of damaged concrete piles over water.

d. To reduce underwater noise during timber pile extractions, direct pull and vibratory methods shall be used.

e. Underwater noise dampening measures for pile driving, such as noise dampening wooden blocks, air bubble curtains, or coffer dams shall be used as applicable.

5. Wildlife and Special Status Species

a. For all projects in water shallower than -15 feet Mean Lower Low Water, and wharf maintenance projects involving the repair, removal, or replacement of 10 or more piles in the front waterside half of the wharf where light conditions allow for eelgrass growth, a pre-project eelgrass survey shall be conducted in accordance with the CEMP. If eelgrass is found within the project vicinity, a post-project survey shall be conducted and impacts to eelgrass shall be mitigated per the CEMP.

b. If work is performed within 500 feet of a California least tern nesting site, the Port shall provide notification to the appropriate agencies.

6. Stormwater

a. The project shall comply with the local regulations associated with the Los Angeles Water Board's Municipal Stormwater Permit issued to Los Angeles and Ventura County and co-permittees under NPDES No. CAS004004 and Waste Discharge Requirements Order No. R4-2021-0105 or subsequent order or subsequent order.

b. If not enrolled in the General Construction Permit, the Permittee shall develop and implement a site-specific Storm Water Pollution Prevention Plan (SWPPP) and a Rain Event Action Plan (REAP) as described in the General Construction Permit.

H. On-site Mitigation for Temporary Impacts

1. The Permittee shall restore all areas of temporary impacts to waters of the state.

XV. Water Quality Certification

I hereby issue the Order for the Port of Los Angeles Wharf Maintenance and Maintenance Dredging Project, 4WQC40123078 certifying that as long as all of the conditions listed in this Order are met, any discharge from the referenced Project will comply with the applicable provisions of Clean Water Act sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 303 (Water Quality Standards and Implementation Plans), 306 (National Standards of Performance), and 307 (Toxic and Pretreatment Effluent Standards).

This discharge is also regulated pursuant to State Water Board Water Quality Order No. 2003-0017-DWQ which authorizes this Order to serve as Waste Discharge Requirements pursuant to the Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.).

Except insofar as may be modified by any preceding conditions, all Order actions are contingent on: (a) the discharge being limited and all proposed mitigation being completed in strict compliance with the conditions of this Order and the attachments to this Order; and, (b) compliance with all applicable requirements of Statewide Water Quality Control Plans and Policies, the Regional Water Boards' Water Quality Control Plans and Policies.

Jenny Newman Digitally signed by Jenny Newman
Date: 2023.09.18 15:47:17 -07'00'
Water Boards

for Susana Arredondo
Executive Officer
Los Angeles Water Quality Control Board

Date

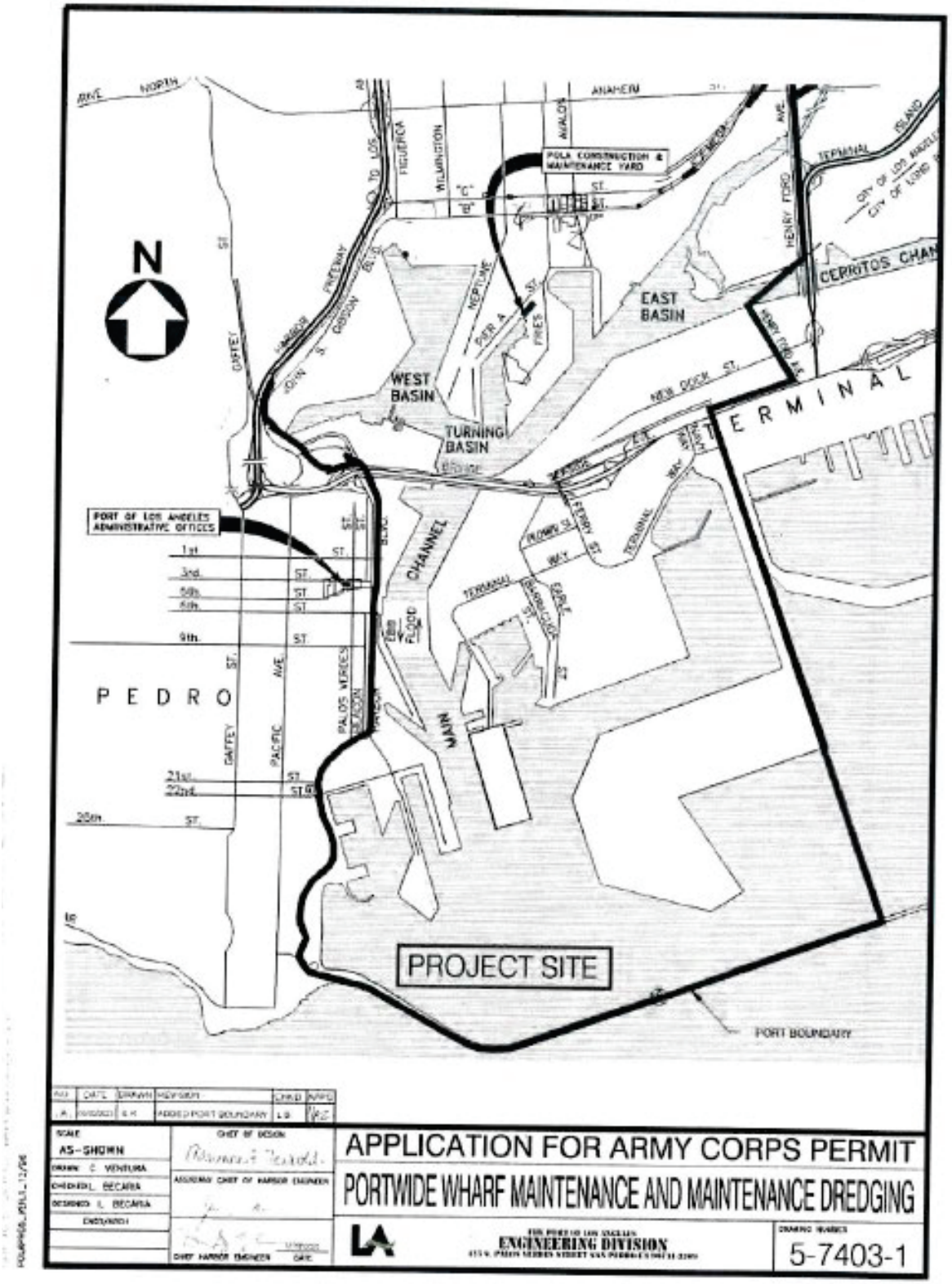


Figure 1: Project site location, Port of Los Angeles, dredging locations.

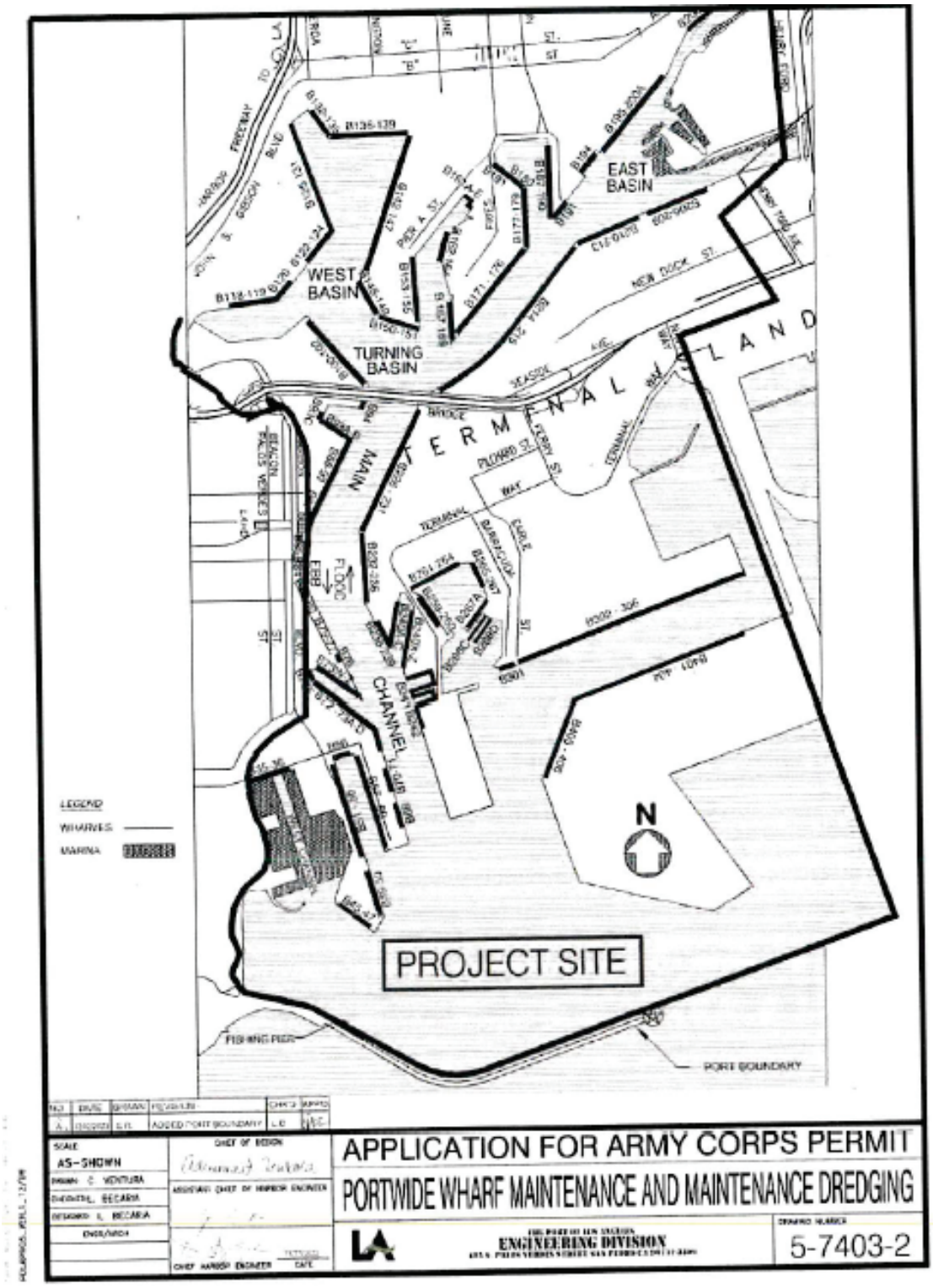


Figure 2. Port Of Los Angeles maintenance project Berth locations.

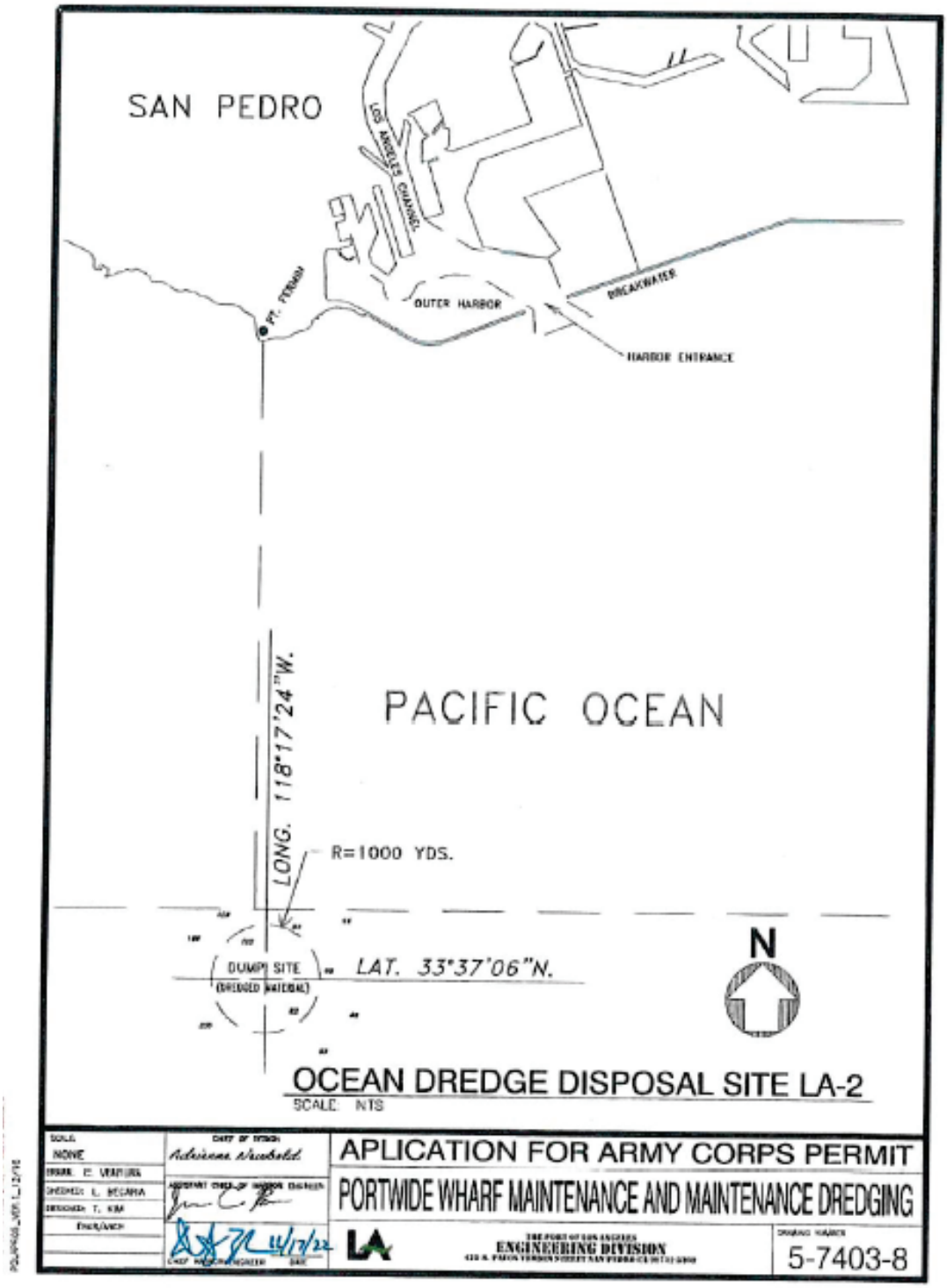


Figure 3. LA-2, ocean dredge disposal site for qualified dredging projects.

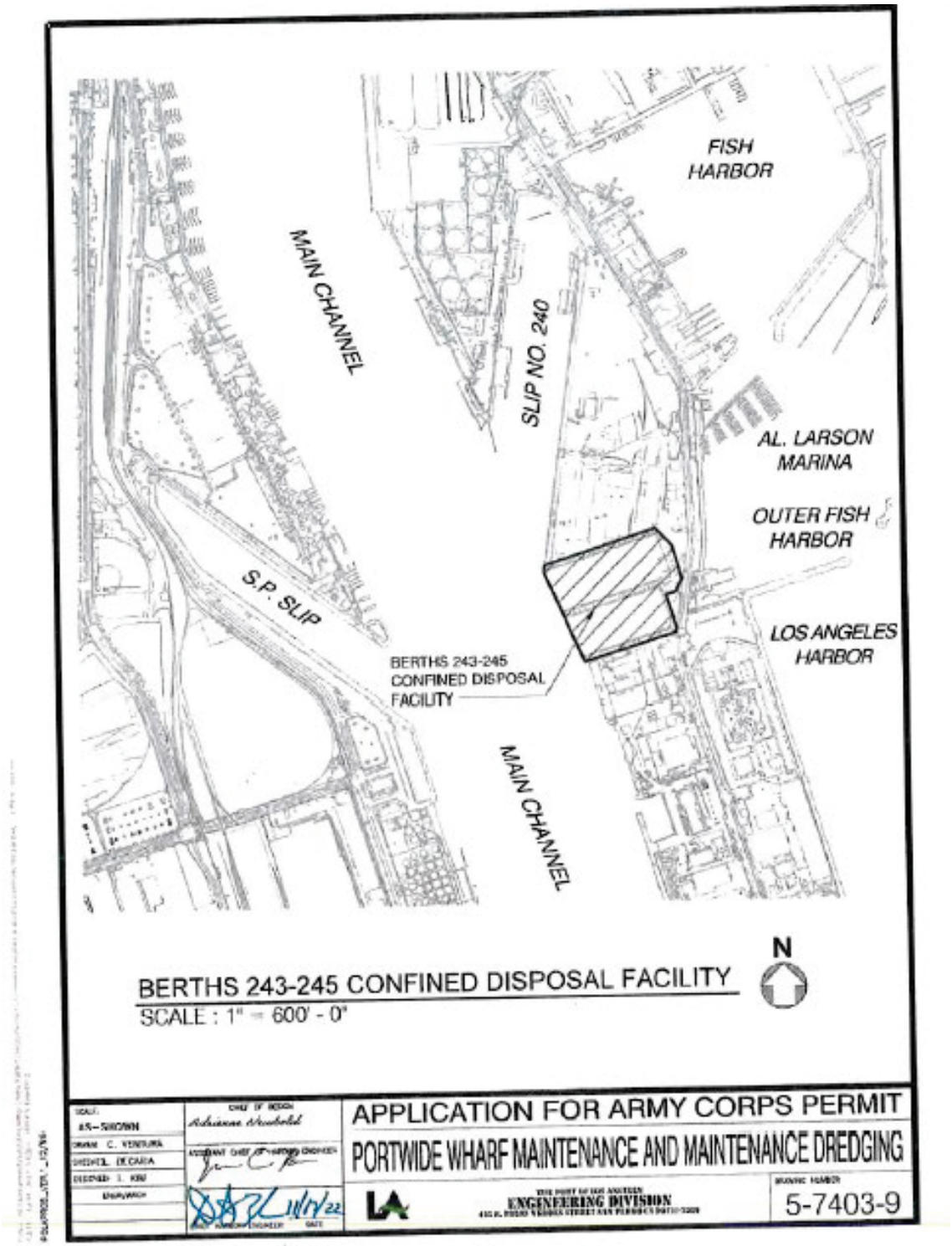


Figure 4. Berths 243-245 Confined Disposal Facility (CDF) dredged material disposal facility.

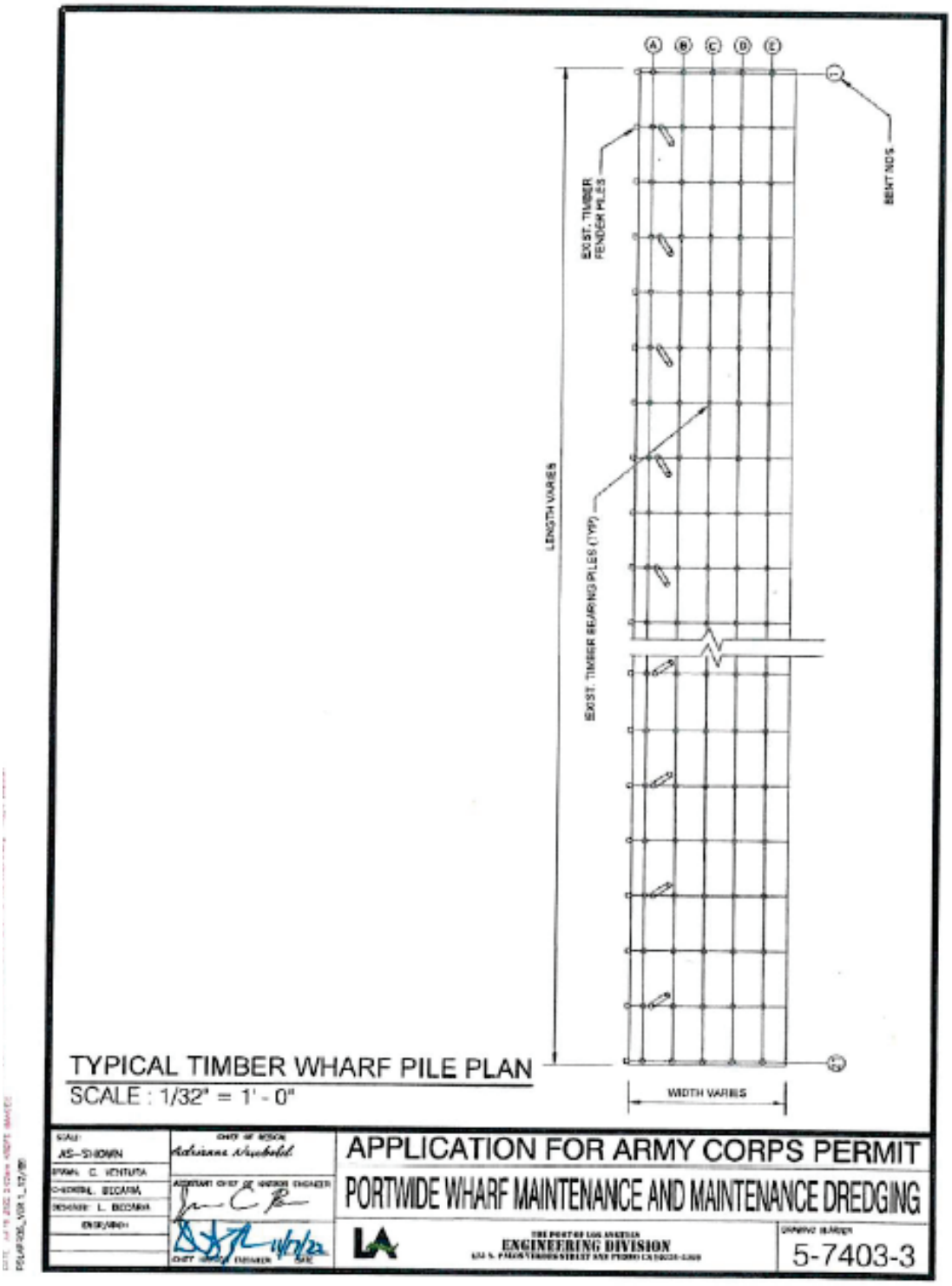


Figure 5. An example of a timber wharf pile that could be replaced under maintenance activities.

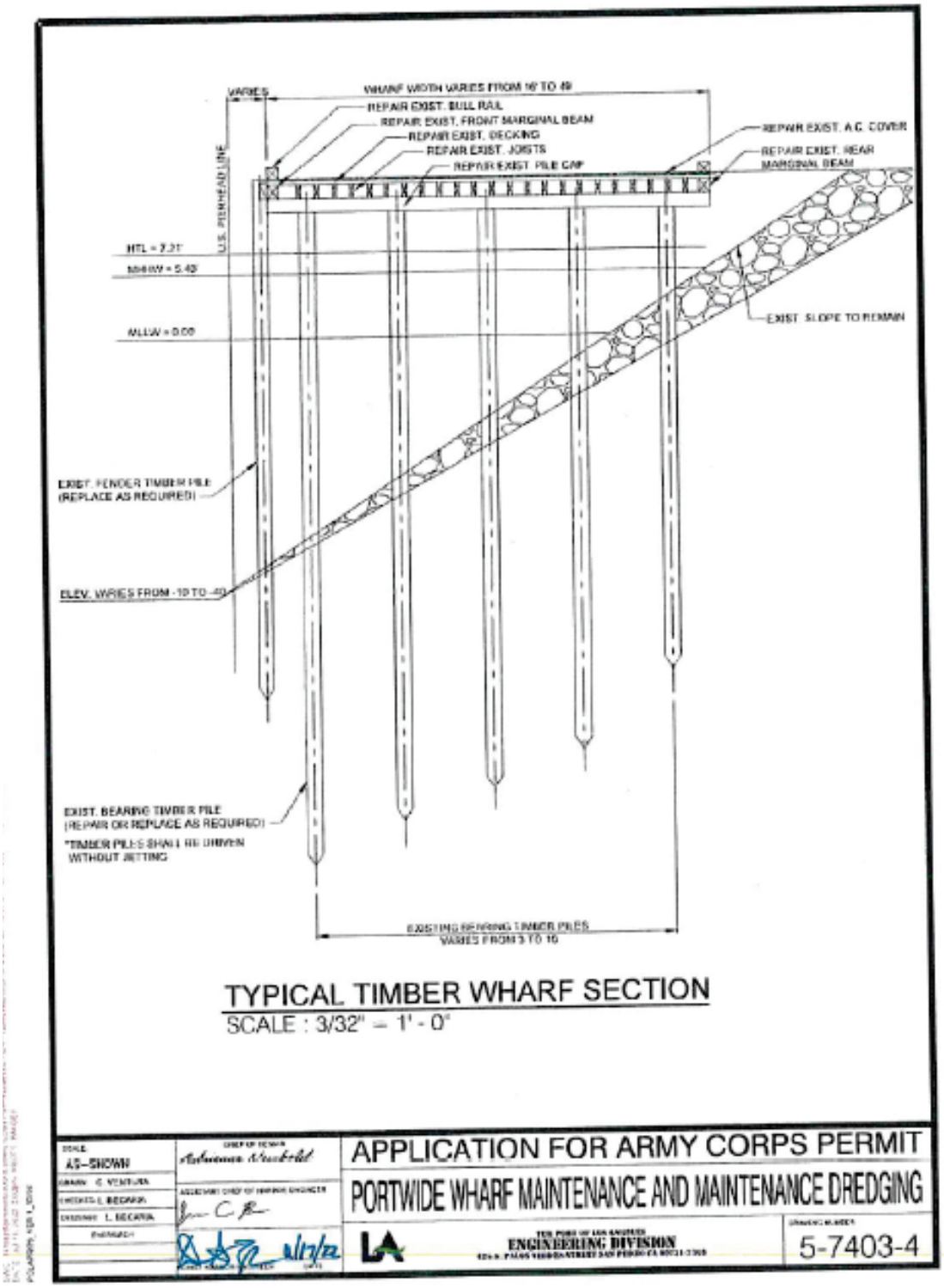


Figure 6. An example of a timber wharf cross section that could be replaced or repaired under maintenance activities.

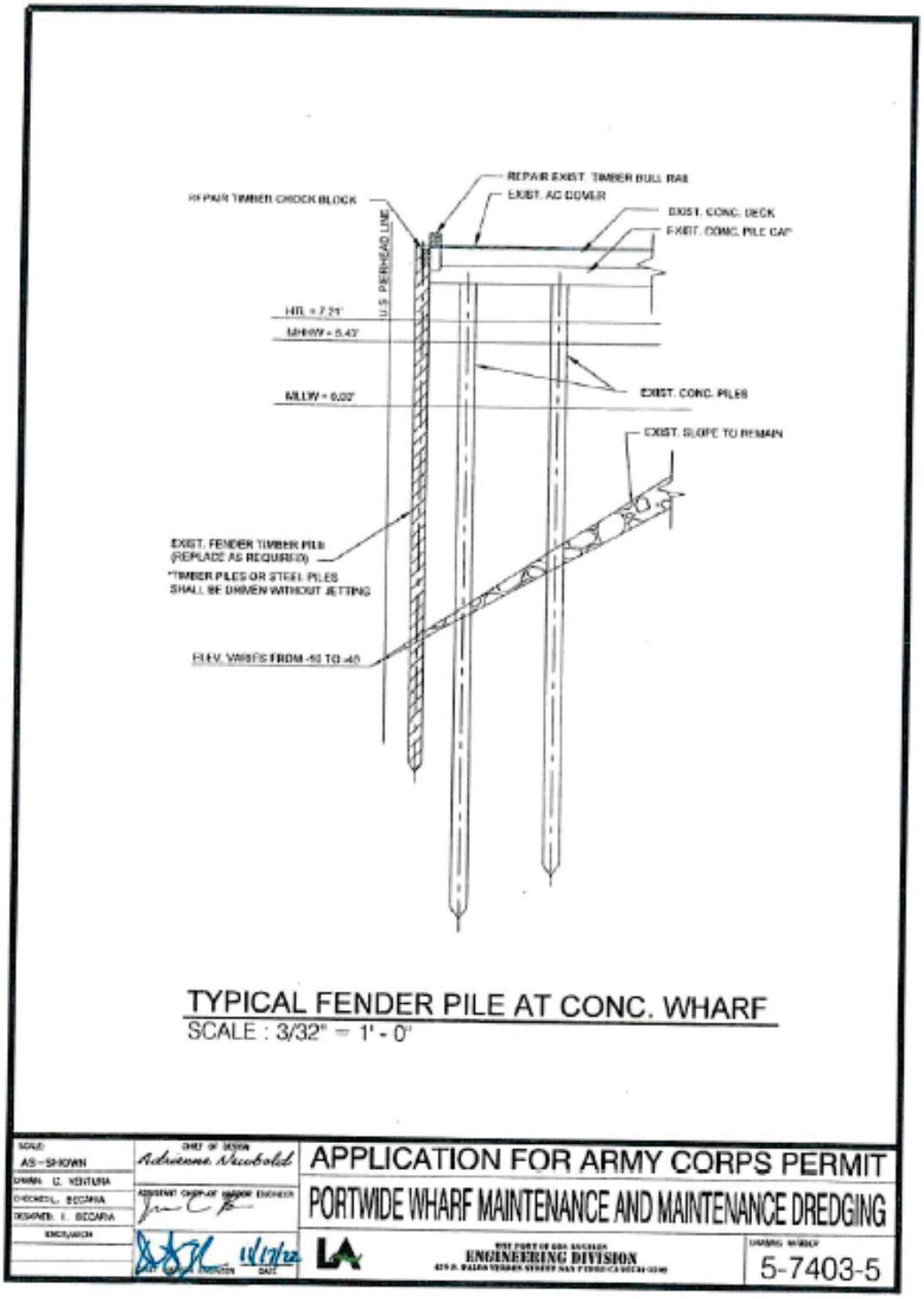


Figure 7. An example of a typical fender pile at a concrete wharf, which could be repaired under maintenance activities.

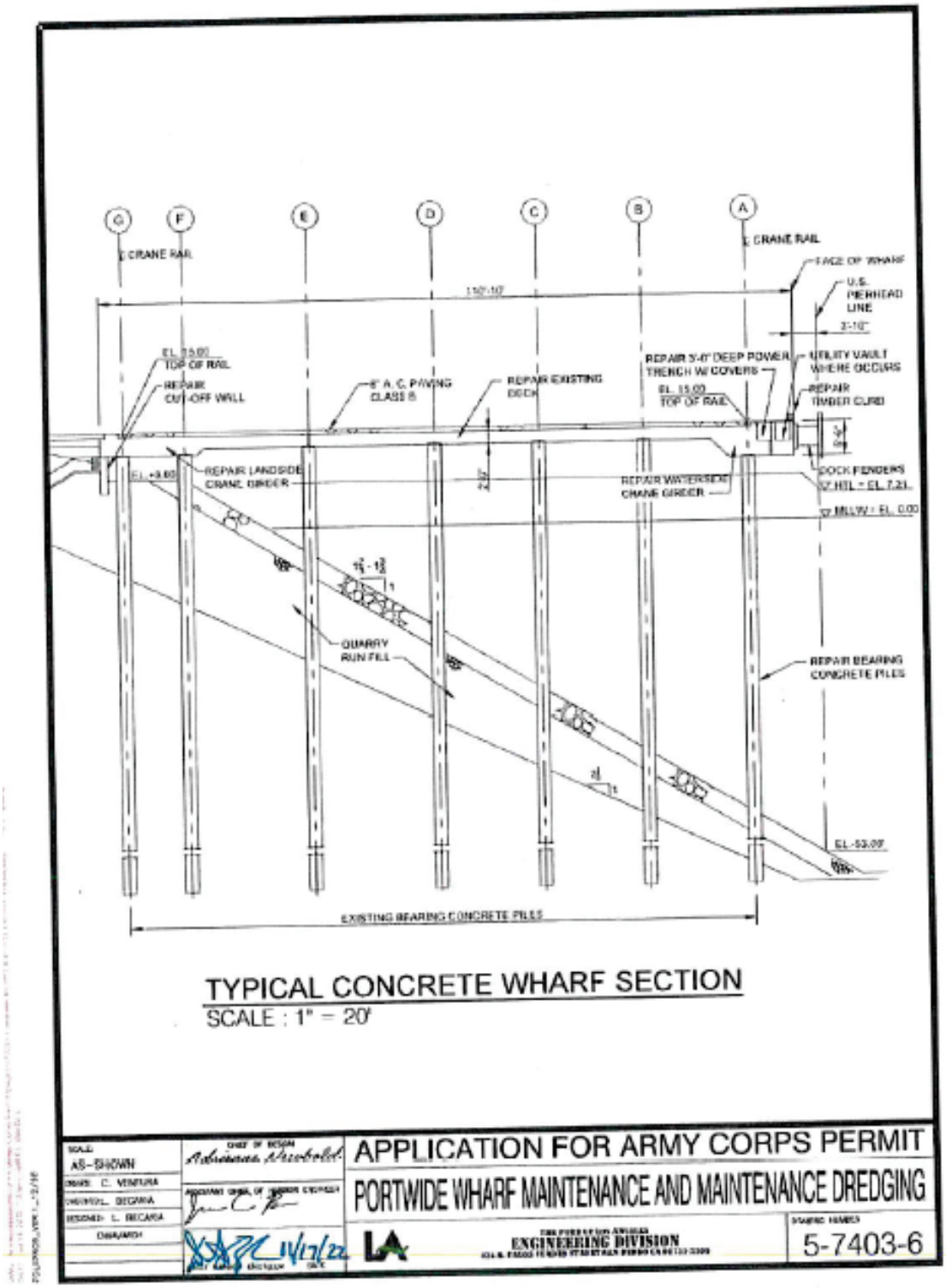


Figure 8. An example of a concrete wharf section, which could be repaired under maintenance activities.

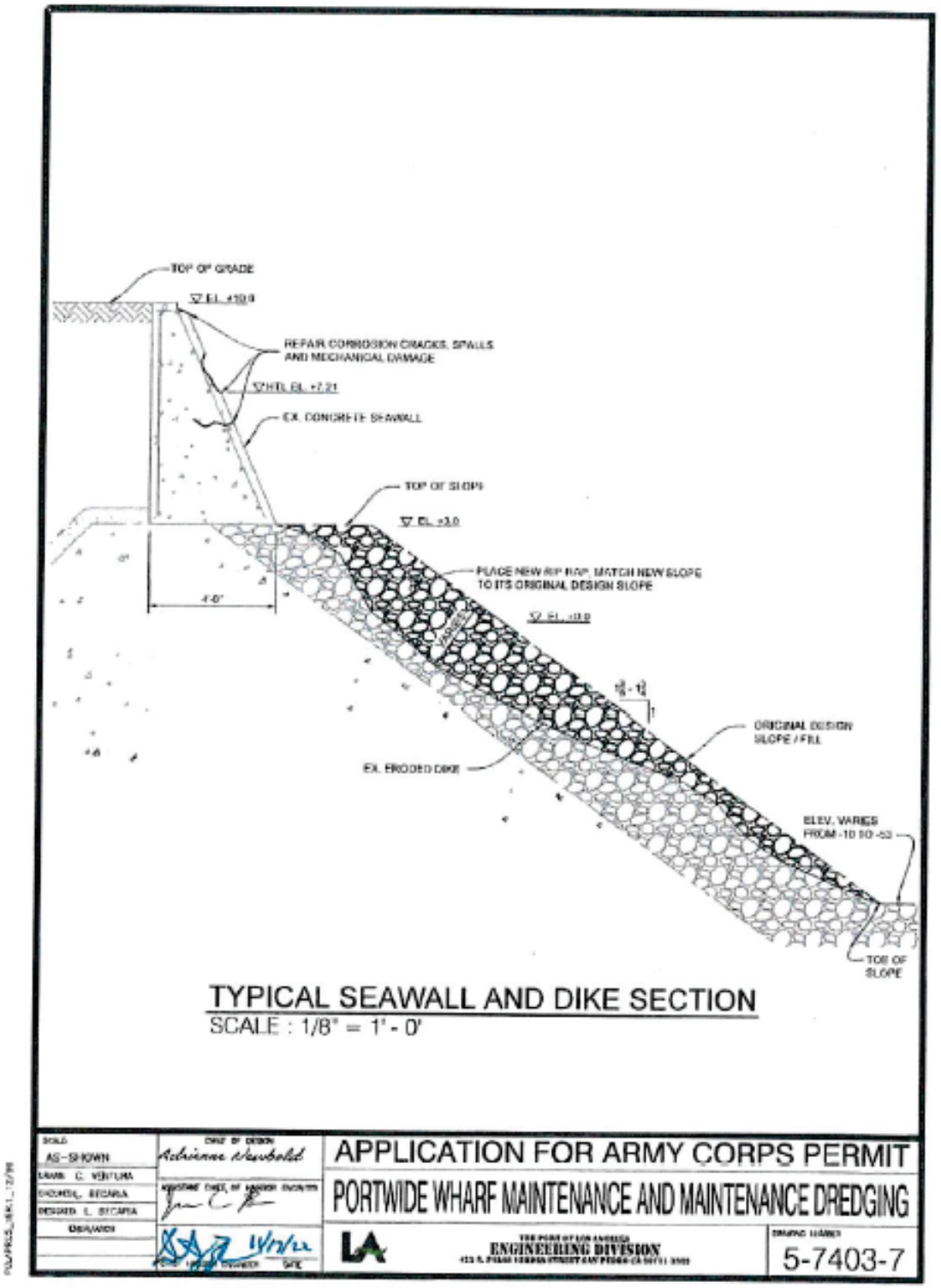
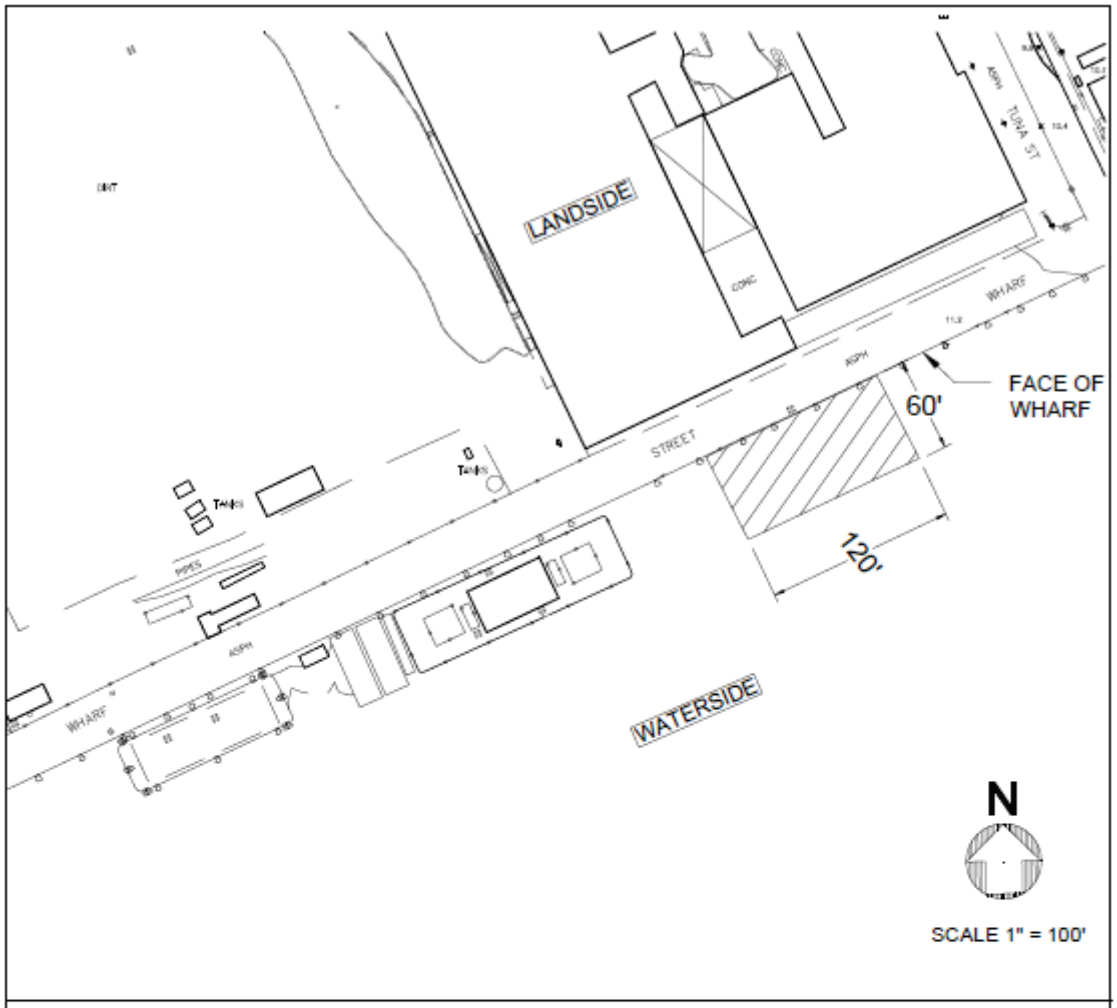


Figure 9. An example of a seawall and dike section, which could be repaired under maintenance activities.



LEGEND:

TEMPORARY IMPACT AREA = 0.17 ACRES PER PROJECT

ASSUMPTIONS:

1. TWELVE (12) PILES PER PROJECT BASED ON THE TOTAL NUMBER OF PILES DRIVEN AND THE TOTAL NUMBER OF PROJECTS DURING THE LAST FIVE YEARS. SEE PAGE 2 OF 2 FOR CALCULATIONS
2. ONE (1) BARGE PER PROJECT
3. TOTAL NUMBER OF PROJECTS OVER FIVE YEARS = 44
4. WATERSIDE WORK AREA PER PROJECT = 0.17 ACRES/PROJECT
5. TOTAL TEMPORARY IMPACT AREA OVER 10 YEARS = 44 x 0.17 ACRE x 2 = 14.96 ACRES

TYPICAL TEMPORARY IMPACT AREA DUE TO WHARF MAINTENANCE ACTIVITY

Figure 10. An example of the typical temporary impact area due to wharf maintenance activities.

SIGNATORY REQUIREMENTS

All Documents Submitted In Compliance With This Order
Shall Meet The Following Signatory Requirements:

1. All applications, reports, or information submitted to the Los Angeles Water Quality Control Board (Los Angeles Water Board) must be signed and certified as follows:

   a) For a corporation, by a responsible corporate officer of at least the level of vice-president.
   b) For a partnership or sole proprietorship, by a general partner or proprietor, respectively.
   c) For a municipality, or a state, federal, or other public agency, by either a principal executive officer or ranking elected official.

2. A duly authorized representative of a person designated in items 1.a through 1.c above may sign documents if:

   a) The authorization is made in writing by a person described in items 1.a through 1.c above.
   b) The authorization specifies either an individual or position having responsibility for the overall operation of the regulated activity.
   c) The written authorization is submitted to the Los Angeles Water Board Staff Contact prior to submitting any documents listed in item 1 above.

3. Any person signing a document under this section shall make the following certification:

   "I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Copies of this Form

Include a copy of the Project specific Cover Sheet below with your report: please retain a copy for your records.

Report Submittal Instructions

1. Check the box on the Report and Notification Cover Sheet next to the report or notification you are submitting.
   - **Part A (Annual Report):** This report will be submitted annually from the anniversary of Project effective date until a Notice of Project Complete Letter is issued.
   - **Part B (Project Status Notifications):** Used to notify the Los Angeles Water Board of the status of the Project schedule that may affect Project billing.
   - **Part C (Conditional Notifications and Reports):** Required on a case by case basis for accidental discharges of hazardous materials, violation of compliance with water quality standards, notification of in-water work, or other reports.
2. Sign the Report and Notification Cover Sheet and attach all information requested for the Report Type.
3. **Electronic Report Submittal Instructions:**
   - Submit signed Report and Notification Cover Sheet and required information via email to: RB4-401Certification@Waterboards.ca.gov
   - Include in the subject line of the email: Subject: ATTN: Emily Duncan; File No: 23-078, Reg. Measure ID: 452165 Report

Definition of Reporting Terms

1. **Active Discharge Period:** The active discharge period begins with the effective date of this Order and ends on the date that the Permittee receives a Notice of Completion of Discharges Letter or, if no post-construction monitoring is required, a Notice of Project Complete Letter. The Active Discharge Period includes all elements of the Project including site construction and restoration, and any Permittee responsible compensatory mitigation construction.
2. **Request for Notice of Completion of Discharges Letter:** This request by the Permittee to the Los Angeles Water Board staff pertains to projects that have post construction monitoring requirements, e.g. if site restoration was required to be monitored for 5 years following construction. Los Angeles Water Board staff will review the request and send a Completion of Discharges Letter to the Permittee upon approval. This letter will initiate the post-discharge monitoring period and a change in fees from the annual active discharge fee to the annual post-discharge monitoring fee.

3. **Request for Notice of Project Complete Letter:** This request by the Permittee to the Los Angeles Water Board staff pertains to projects that either have completed post-construction monitoring and achieved performance standards or have no post-construction monitoring requirements, and no further Project activities are planned. Los Angeles Water Board staff will review the request and send a Project Complete Letter to the Permittee upon approval. Termination of annual invoicing of fees will correspond with the date of this letter.
4. **Post-Discharge Monitoring Period:** The post-discharge monitoring period begins on the date of the Notice of Completion of Discharges Letter and ends on the date of the Notice of Project Complete Letter issued by the Los Angeles Water Board staff. The Post-Discharge Monitoring Period includes continued water quality monitoring or compensatory mitigation monitoring.
5. **Effective Date:** Date of Order issuance.

Map/Photo Documentation Information

When submitting maps or photos, please use the following formats.

1. **Map Format Information:**
   Preferred map formats of at least 1:24000 (1" = 2000') detail (listed in order of preference):
   - **GIS shapefiles**: The shapefiles must depict the boundaries of all project areas and extent of aquatic resources impacted. Each shape should be attributed with the extent/type of aquatic resources impacted. Features and boundaries should be accurate to within 33 feet (10 meters). Identify datum/projection used and if possible, provide map with a North American Datum of 1983 (NAD38) in the California Teale Albers projection in feet.
   - **Google KML files** saved from Google Maps: My Maps or Google Earth Pro. Maps must show the boundaries of all project areas and extent/type of aquatic resources impacted. Include URL(s) of maps. If this format is used include a spreadsheet with the object ID and attributed with the extent/type of aquatic resources impacted.
   - **Other electronic format** (CAD or illustration format) that provides a context for location (inclusion of landmarks, known structures, geographic coordinates, or USGS DRG or DOQQ). Maps must show the boundaries of all project areas and extent/type of aquatic resources impacted. If this format is used include a spreadsheet with the object ID and attributed with the extent/type of aquatic resources impacted.
   - Aquatic resource maps marked on paper **USGS 7.5 minute topographic maps** or **Digital Orthophoto Quarter Quads (DOQQ)** printouts. Maps must show the boundaries of all project areas and extent/type of aquatic resources impacted. If this format is used include a spreadsheet with the object ID and attributed with the extent/type of aquatic resources impacted.
2. **Photo-Documentation:** Include a unique identifier, date stamp, written description of photo details, and latitude/longitude (in decimal degrees) or map indicating location of photo. Successive photos should be taken from the same vantage point to compare pre/post construction conditions.

REPORT AND NOTIFICATION COVER SHEET

Project:	Port of Los Angeles Wharf Maintenance and Maintenance Dredging Project				
Permittee:	Port of Los Angeles				
Reg. Meas. ID:	452165	**Place ID:**	887519	**File No:**	23-078

Report Type Submitted

Part A – Project Reporting	
Report Type	☐ **Annual Report**
Part B - Project Status Notifications	
Report Type	☐ **Request for Completion of Eelgrass survey**
Report Type	☐ **Commencement of Construction**
Report Type	☐ **Request for Notice of Project Complete Letter**
Part C - Conditional Notifications and Reports	
Report Type	☐ **Accidental Discharge of Hazardous Material Report**
Report Type	☐ **Violation of Compliance with Water Quality Standards Report**
Report Type	☐ **In-Water Work/Diversions Water Quality Monitoring Report**
Report Type	☐ **Modifications to Project Report**
Report Type	☐ **Transfer of Property Ownership Report**

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Print Name [1]	**Affiliation and Job Title**
Signature	**Date**

[1]STATEMENT OF AUTHORIZATION (include if authorization has changed since application was submitted)

I hereby authorize _____ to act in my behalf as my representative in the submittal of this report, and to furnish upon request, supplemental information in support of this submittal.

Permittee's Signature

Date

***This Report and Notification Cover Sheet must be signed by the Permittee or a duly authorized representative and included with all written submittals.**

Part A – Project Reporting

Report Type	**Annual Report**
Report Purpose	Notify the Los Angeles Water Board staff of Project status during both the active discharge and post-discharge monitoring periods.
When to Submit	Annual reports shall be submitted each year on the anniversary of Project effective date. Annual reports shall continue until a Notice of Project Complete Letter is issued to the Permittee.
Report Contents	The contents of the annual report shall include the topics indicated below for each project period. Report contents are outlined in Annual Report Topics below. **<u>During the Active Discharge Period</u>** • **Topic 1: Construction Summary** • **Topic 2: Mitigation for Temporary Impacts Status** • **Topic 3: Compensatory Mitigation for Permanent Impacts Status** **<u>During the Post-Discharge Monitoring Period</u>** • **Topic 2: Mitigation for Temporary Impacts Status** • **Topic 3: Compensatory Mitigation for Permanent Impacts Status**
Annual Report Topics (1-3)	
Annual Report Topic 1	**Construction Summary**
When to Submit	With the annual report during the Active Discharge Period.
Report Contents	**1.** Project progress and schedule including initial ground disturbance, site clearing and grubbing, road construction, site construction, and the implementation status of construction storm water best management practices (BMPs). If construction has not started, provide estimated start date and reasons for delay. **2.** Color photos, pre-project and current. **3.** Map showing general Project progress. **4.** If applicable: **a.** Summary of any conditional reports sent during the year such as "Accidental Discharge of Hazardous Material Report" or "Accidental Discharge of Hazardous Material Report" **b.** Copies of revised permits from other agencies **c.** Compilation of all water quality monitoring results for the year in a spreadsheet format.
Annual Report Topic 2	**Mitigation for Temporary Impacts Status**
When to Submit	With the annual report during both the Active Discharge Period and Post-Discharge Monitoring Period.

Report Contents	***If not applicable report N/A.** **1.** Planned date of initiation and map showing locations of mitigation for temporary impacts to waters of the state and all upland areas of temporary disturbance which could result in a discharge to waters of the state**.** **2.** If mitigation for temporary impacts has already commenced, provide a map and information concerning attainment of mitigation success.
Annual Report Topic 3	**Compensatory Mitigation for Permanent Impacts Status**
When to Submit	With the annual report during both the Active Discharge Period and Post-Discharge Monitoring Period.
Report Contents	***If not applicable report N/A.** **Part A. Permittee Responsible** **1.** Planned date of initiation of compensatory mitigation site installation**.** **2.** If installation is in progress, a map of what has been completed to date. **3.** If the compensatory mitigation site has been installed, provide a final map and information concerning attainment of performance standards contained in the compensatory mitigation plan. **Part B. Mitigation Bank or In-Lieu Fee** **1.** Status or proof of purchase of credit types and quantities. **2.** Include the name of bank/ILF Program and contact information. **3.** If ILF, location of project and type if known.

Part B – Project Status Notifications

Report Type	**Notice of Completion of an Eelgrass survey**
Report Purpose	Notify Los Angeles Water Board staff of the completion of an Eelgrass survey.
When to Submit	Construction shall not begin before approval of the survey by the Los Angeles Regional Water Board.
Report Contents	**1.** An eelgrass survey conducted following the California Eelgrass Mitigation Policy (CEMP) instructions. **2.** As stated in CEMP, a survey must be conducted during the active growth period for eelgrass (typically March through October for southern California) no more than 60 days prior to construction activities.

Report Type	**Commencement of Construction**
Report Purpose	Notify Los Angeles Water Board staff prior to the start of construction.
When to Submit	Must be received at least seven (7) days prior to start of initial ground disturbance activities.
Report Contents	**3.** Date of commencement of construction. **4.** Anticipated date when discharges to waters of the state will occur. **5.** Project schedule milestones including a schedule for onsite compensatory mitigation, if applicable.

Report Type	Request for Notice of Completion of Discharges Letter
Report Purpose	Notify Los Angeles Water Board staff that post-construction monitoring is required and that active Project construction, including any mitigation and permittee responsible compensatory mitigation, is complete.
When to Submit	Must be received by Los Angeles Water Board staff within thirty (30) days following completion of all Project construction activities.
Report Contents	**1.** Pre- and post-photo documentation of all Project activity sites where the discharge of dredge and/or fill/excavation was authorized. **2.** An updated monitoring schedule for mitigation for temporary impacts to waters of the state and permittee responsible compensatory mitigation during the post-discharge monitoring period, if applicable.

Report Type	Request for Notice of Project Complete Letter
Report Purpose	Notify Los Angeles Water Board staff that construction and/or any post-construction monitoring is complete, or is not required, and no further Project activity is planned.
When to Submit	Must be received by Los Angeles Water Board staff within thirty (30) days following completion of all Project activities.
Report Contents	**Part A: Mitigation for Temporary Impacts** **1.** A report establishing that areas of temporary impacts to waters of the state, and upland areas of temporary disturbance which could result in a discharge to waters of the state, have been successfully restored and all identified success criteria have been met. Pre- and post-photo documentation of all restoration sites. **Part B: Permittee Responsible Compensatory Mitigation** **2.** A report establishing that the performance standards outlined in the compensatory mitigation plan have been met. **3.** Status on the implementation of the long-term maintenance and management plan and funding of endowment. **4.** Pre- and post-photo documentation of all compensatory mitigation sites. **5.** Final maps of all compensatory mitigation areas (including buffers). **Part C: Post-Construction Storm Water BMPs** **6.** Date of storm water permit Notice of Termination(s), if applicable. **7.** Report status and functionality of all post-construction BMPs.

Part C – Conditional Notifications and Reports

Report Type	Accidental Discharge of Hazardous Material Report
Report Purpose	Notifies Los Angeles Water Board staff that an accidental discharge of hazardous material has occurred.

When to Submit	Within five (5) working days following the date of an accidental discharge. Continue reporting as required by Los Angeles Water Board staff.
Report Contents	**1.** The report shall include the OES Incident/Assessment Form, a full description and map of the accidental discharge incident (i.e. location, time and date, source, discharge constituent and quantity, aerial extent, and photo documentation). If applicable, the OES Written Follow-Up Report may be substituted. **2.** If applicable, any required sampling data, a full description of the sampling methods including frequency/dates and times of sampling, equipment, locations of sampling sites. **3.** Locations and construction specifications of any barriers, including silt curtains or diverting structures, and any associated trenching or anchoring.

Report Type	**Violation of Compliance with Water Quality Standards Report**
Report Purpose	Notifies Los Angeles Water Board staff that a violation of compliance with water quality standards has occurred.
When to Submit	The Permittee shall report any event that causes a violation of water quality standards within three (3) working days of the noncompliance event notification to Los Angeles Water Board staff.
Report Contents	The report shall include: the cause; the location shown on a map; and the period of the noncompliance including exact dates and times. If the noncompliance has not been corrected, include: the anticipated time it is expected to continue; the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and any monitoring results if required by Los Angeles Water Board staff.

Report Type	**In-Water Work and Diversions Water Quality Monitoring Report**
Report Purpose	Notifies Los Angeles Water Board staff of the completion of in-water work.
When to Submit	Within three (3) working days following the completion of in-water work. Continue reporting in accordance with the approved water quality monitoring plan.
Report Contents	As required by the approved water quality monitoring plan.

Report Type	**Modifications to Project Report**
Report Purpose	Notifies Los Angeles Water Board staff if the Project, as described in the application materials, is altered in any way or by the imposition of subsequent permit conditions by any local, state or federal regulatory authority.
When to Submit	Prior to any alteration or modification of Project activities.
Report Contents	A description and location of any alterations of Project activities. Identify any Project modifications that will interfere with the Permittee's compliance with the Order. Any alteration may require an Amendment, to be determined by Los Angeles Water Board staff.

Report Type	Transfer of Property Ownership Report
Report Purpose	Notifies Los Angeles Water Board staff of change in ownership of the Project or Permittee-responsible mitigation area.
When to Submit	At least 10 working days prior to the transfer of ownership.
Report Contents	**1.** A statement that the Permittee has provided the purchaser with a copy of this Order and that the purchaser understands and accepts: **a.** the Order's requirements and the obligation to implement them or be subject to administrative and/or civil liability for failure to do so; and **b.** responsibility for compliance with any long-term BMP[1] maintenance plan requirements in this Order. **2.** A statement that the Permittee has informed the purchaser to submit a written request to the Los Angeles Water Board to be named as the permittee in a revised order.

[1] Best Management Practices (BMPs) is a term used to describe a type of water pollution or environmental control.

Compliance with Code of Federal Regulations, title 40, section 121.7, subdivision (d).

The purpose of this attachment is to comply with Title 40, Code of Federal Regulations (CFR) Part 121.7(d)(1), which requires an explanation of why a condition is necessary to assure that the authorized discharge will comply with water quality requirements, and a citation to federal, state, or tribal law that authorizes the condition.

This Attachment uses the same organizational structure as the *Conditions* Section, and the statements below correspond with the conditions set forth in the *Conditions* Section. The Sections preceding the *Conditions* Section are not "conditions" as used in 40 CFR section 121.7.(A).

The following three sources of authority are applicable to almost all conditions. Because these authorities are relevant to so many conditions, they are described in greater detail here and then cross-referenced below.

The state's Statement of Policy with respect to Maintaining High Quality of Waters in California ("Antidegradation Policy", State Board Resolution No. 68-16), requires that any "activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the state will be maintained." All Regional Board Water Quality Control Plans incorporate the state's Antidegradation Policy by reference. The state Antidegradation Policy incorporates the federal Antidegradation Policy (40 CFR Part 131.12), which requires "[e]xisting instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected." According to U.S. EPA, for dischargers of dredged or fill material comply with the federal Antidegradation Policy by complying with U.S. EPA's section 404(b)(1) Guidelines. The State Water Board adopted a modified version of U.S. EPA's section 404(b)(1) Guidelines in the Dredge or Fill Procedures (also referred as State Supplemental Guidelines).

The State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (Dredge or Fill Procedures) were adopted on April 2, 2019 and went into effect on May 28, 2020. The Dredge or Fill Procedures were adopted pursuant to the State Water Board's authority under Water Code section 13140 (state policy for water quality control) and 13170 (water quality control plan), and accordingly have regulatory effect. Consistent with Government Code, section 11353, a clear and concise summary of the Dredge or Fill Procedures is available in California Code of Regulations, section 3013. Per the Dredge or Fill Procedures, the permitting authority may only approve a project if the demonstrations set forth in Section IV.B.1 have been made. The information required by Section IV.A is necessary to ensure compliance with Section IV.B.1.

In addition, the conditions within the Order are generally required pursuant to the Los Angeles Water Board's Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan). The Basin Plan includes water quality standards, which consist of existing and potential beneficial uses of waters of the state, water quality objectives to protect those uses, and the state and federal antidegradation policies. For instance, the Basin Plan

includes water quality objectives for chemical constituents, oil and grease, pH, dissolved oxygen, temperature, , toxicity, pesticides, solid, suspended or settleable materials, floating material, turbidity, exotic vegetation, color, and taste and odor which ensure protection of beneficial uses.

Furthermore, the conditions within the Order are also required, where applicable, pursuant to statewide water quality control plans and policies which were adopted and are periodically revised pursuant to Water Code section 13240, including, but not limited to, the following:

- California Ocean Plan (Ocean Plan),
- California Thermal Plan (Thermal Plan),
- Enclosed Bays and Estuaries Plan,
- Inland Surface Waters, Enclosed Bays, and Estuaries (ISWEBE) Plan,
- Plan for California's Nonpoint Source (NPS) Pollution Control Program,
- Water Quality Control Policy for the Enclosed Bays and Estuaries of California,
- Policy for the Implementation and Enforcement of the Nonpoint Source (NPS) Pollution Control Program,
- State of California Executive Order W-59-93 (Wetlands "No Net Loss" Policy), and

Furthermore, California Code of Regulations, title 23, Chapter 28 also sets forth regulations pertaining to water quality certifications. Section 3856 sets forth information that must be included in water quality certification requests, includes a description of steps that have or will be taken to avoid, minimize, and compensate for impacts to waters of the state.

Conditions

Authorization

Authorization under this Order is granted based on the application information submitted. Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order.

Reporting and Notification Requirements

The reports confirm that the best management practices required under this Order are sufficient to protect beneficial uses and water quality objectives. The reports related to accidental discharges also ensure that corrective actions, if any, that are necessary to minimize the impact or clean up such discharges are taken as soon as possible. These monitoring and reporting conditions are authorized because the Water Boards have the authority to investigate the quality of any waters of the state within its region under Water Code sections 13383 and 13267. The burden of preparing these reports, including costs, bears a reasonably relationship to the benefits to be obtained from the reports. Specifically, the reports are necessary to demonstrate protection of beneficial uses and compliance with the requirements of the Order and relevant laws (including the Clean Water Act and other authorities). The anticipated costs are minimal as the reporting obligations require only visual monitoring, in-field measurements, and notification reporting.

Authorization under this Order is granted based on the application information submitted, including identification of the legally responsible party. Conditions regarding transfers are necessary to confirm whether the new owner wishes to assume legal responsibility for compliance with this Order. If not, the original discharger remains responsible for compliance with this Order. Confirmation is also necessary to confirm whether liability for long-term best management practices maintenance is accepted by another entity. If not, the original discharger remains responsible for compliance with this Order. Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order.

Water Quality Monitoring

General

This monitoring condition is authorized because the Water Boards have the authority to investigate the quality of any waters of the state within its region under Water Code sections 13383 and 13267. The burden of monitoring, including costs, bears a reasonable relationship to the need for the monitoring, and the benefits to be obtained from the monitoring. The anticipated costs are minimal as only visual monitoring and in-field measurements are required. Specifically, the reports are necessary to demonstrate protection of beneficial uses and compliance with the requirements of the Order and relevant laws (including the Clean Water Act and other authorities

Accidental Discharges/Noncompliance

See explanation for the *Reporting and Notification Requirements* Section

In-Water Work or Diversions

Consistent with the Dredge or Fill Procedures, section IV.A.2.c, water quality monitoring plans are required for any in-water work, including temporary dewatering or diversions. These conditions are required to assure that 1) the discharge shall not adversely affect the beneficial uses of the receiving water or cause a condition of nuisance; 2) the discharge shall comply with all applicable water quality objectives; and 3) treatment and control of the discharge shall be implemented to assure that pollution and nuisance will not occur and the highest water quality is maintained. A water quality monitoring plan is necessary to conform to water quality standards for oil and grease, dissolved oxygen, pH, turbidity, and temperature. The Regional Water Board's Basin Plan and/or applicable statewide plans and policies contains provisions related to all these constituents.

These monitoring and reporting conditions are authorized because the Water Boards have the authority to investigate the quality of any waters of the state within its region under Water Code sections 13383 and 13267. The burden of preparing these reports, including costs, bears a reasonable relationship to the need for, and benefits of, the reports. The anticipated costs are minimal as the sampling requirements are either visual or only require a grab sample on a daily and/or weekly basis. Specifically, the reports are necessary to demonstrate protection of beneficial uses and compliance with the requirements of the Order and relevant laws (including the Clean Water Act and other authorities

Post-Construction

The reports confirm that the best management practices required under this order are sufficient to protect beneficial uses and water quality objectives. The reports related to accidental

discharges ensure that corrective actions, if any, that are necessary to minimize the impact or clean up such discharges are taken as soon as possible. These monitoring and reporting conditions are authorized because the Water Boards have the authority to investigate the quality of any waters of the state within its region under Water Code sections 13383 and 13267. The burden of preparing these reports, including costs, bears a reasonable relationship to the need for, and benefits of, the reports. The anticipated costs are minimal as the reporting obligations require only visual monitoring, in-field measurements, and notification reporting.

Standard Conditions

"This Order is subject to modification or revocation …"

"This Order is not intended and shall not be construed to apply to any activity involving a hydroelectric facility …"

"This Order is conditioned upon total payment of any fee …"

These Conditions are standard conditions that "shall be included as conditions of all water quality certification actions." (Cal. Code of Regs., section 3860.)

General Compliance

"Permitted actions must not cause a violation of any applicable water quality standards …"

By the plain language of section 401 of the Clean Water Act, permitted actions may not cause a violation of applicable water quality standards. This condition related to compliance with water quality objectives and designated beneficial uses is required pursuant to the Los Angeles Water Board's Basin Plan and/or other applicable statewide plans and policies. The Basin Plan's water quality standards consist of existing and potential beneficial uses of waters of the state, water quality objectives to protect those uses, and the state and federal antidegradation policies. The Antidegradation Policy requires that the quality of existing high-quality water be maintained unless any change will be consistent with the maximum benefit to the people of the state, will not unreasonably affect present or anticipated future beneficial uses of such water, and will not result in water quality less than that prescribed in water quality control plans or policies. The Antidegradation Policy further requires best practicable treatment or control of the discharge necessary to assure that pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the state will be maintained. Applicable beneficial uses and water quality objectives to protect those uses include the designated beneficial uses (Basin Plan, Chapter 2, Tables 2-1, 2-1a, 2-3, 2-3a, 2-4, and 2-4a; Ocean Plan, Page 4), and water quality objectives for chemical constituents (Basin Plan, page 3-29), color (Basin Plan, page 3-32), exotic vegetation (Basin Plan, page 3-32), floating material (Basin Plan, page 3-33), oil and grease (Basin Plan, page 3-34), dissolved oxygen (Basin Plan, page 3-39), pesticides (Basin Plan, page 3-40), pH (Basin Plan, page 3-40), solid, suspended and settleable material (Basin Plan, page 3-44), taste and odor (Basin Plan, page 3-44), temperature (Basin Plan, page 3-44), toxicity (Basin Plan, page 3-45), and turbidity (Basin Plan, page 3-46), and in ocean waters for physical (Ocean Plan, page 7), chemical (Ocean Plan, page 7), and biological characteristics (Ocean Plan, page 8).

"The Permittee must, at all times, fully comply with engineering plans, specifications, and technical reports…"

Authorization under this Order is granted based on the application information submitted, including engineering plans, specifications, and technical reports. Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order.

Administrative

"Signatory requirements for all document submittals…"

Conditions related to signatory requirements are also authorized by Water Code sections 13383 and 13267, which requires any person discharging waste that could affects the quality of waters to provide to the Water Boards, under penalty of perjury, any technical or monitoring program reports as required by the Water Boards. The signatory requirements are consistent with 40 C.F.R. section 122.22.

"The Permittee shall grant Los Angeles Water Board staff …"

Conditions related to site access requirements are authorized pursuant to the Water Boards' authority to investigate the quality of any waters of the state within its region under Water Code sections 13383 and 13267. Water Code section 13267(c) provides that "the regional board may inspect the facilities of any person to ascertain whether the purposes of this division are being met and waste discharge requirements are being complied with."

"A copy of this Order shall be provided to any consultants, contractors, and subcontractors …"

"A copy of this Order must be available at the Project site(s) during construction…"

These conditions require site personnel (agents of the applicant) and agencies to be familiar with the content of the Order and mandate availability of the document at the project site. These conditions are required to assure that any authorized discharge will comply with the terms and conditions of the Order and is inherently tied to the signature requirements required by Water Code section 13267.

Best Management Practices

All the conditions related to best management practices are consistent with the Water Board's authority to establish, "[w]ater quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area" pursuant to Water Code section 13241(c). Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order. The activities authorized under this Order have the potential to result in a discharge that exceeds water quality objectives, which is prohibited by the Clean Water Act, Antidegradation Policy and Water Code section 13263. As required by Water Code section 13369, all Water Quality Control Plans incentivize the use of best management practices to prevent prohibited discharges into waters of the state.

Dredging

Dischargers of dredged or fill material comply with the federal Antidegradation Policy by complying with U.S. EPA's section 404(b)(1) Guidelines. The State Water Boards adopted a modified version of U.S. EPA's section 404(b)(1) Guidelines in the Dredge or Fill Procedures

(State Supplemental Guidelines). In addition, this condition is required to assure that dredging operations will comply with water quality objectives established for surface waters, including solid, suspended and settleable material, toxicity and turbidity (Basin Plan, page 3-44, 3-45, 3-46), and in ocean waters physical (Ocean Plan, page 7), chemical (Ocean Plan, page 7), and biological characteristics (Ocean Plan, page 8), Ocean Plan, Thermal Plan, Enclosed Bays and Estuaries Plan, ISWEBE Plan, NPS Pollution Control Program, Water Quality Control Policy for the Enclosed Bays and Estuaries of California, Policy for the Implementation and Enforcement of the NPS Pollution Control Program, Wetlands “No Net Loss” Policy.

Site Management

This condition is necessary to prevent violation of state discharge prohibitions that protect water quality objectives. For instance, fuels and lubricants associated with the use of mechanized equipment have the potential to result in toxic discharges to waters of the state in violation of water quality standards, including the floating material and toxicity and floating material water quality objectives (Basin Plan, pages 3-33 & 3-45), and in ocean waters the physical (Ocean Plan, page 7), chemical (Ocean Plan, page 7), and biological characteristics objectives (Ocean Plan, page 8). Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order. Failure to appropriately manage site conditions has the potential to result in a discharge that exceeds water quality objectives, which is prohibited by the Clean Water Act, Antidegradation Policy and Water Code section 13263, Ocean Plan, Thermal Plan, Enclosed Bays and Estuaries Plan, ISWEBE Plan, NPS Pollution Control Program, Water Quality Control Policy for the Enclosed Bays and Estuaries of California, Policy for the Implementation and Enforcement of the NPS Pollution Control Program, Wetlands “No Net Loss” Policy.

Hazardous Materials

These conditions are required pursuant to the Los Angeles Basin Plan (toxicity objective, page 3-40), and the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP), which prohibit the discharge of substances in concentrations toxic to human, plant, animal, or aquatic life. Toxic compounds can impair the beneficial uses of cold freshwater habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, fish migration, fish spawning, warm freshwater habitat, and wildlife habitat. Conditions related to toxic and hazardous materials are necessary to assure that discharges comply with any water quality objectives adopted or approved under sections 13170 or 13245 of the Water Code.

Conditions related to concrete/cement are required pursuant to the Los Angeles Basin Plan, which require discharges to waters do not adversely raise or lower pH levels (Basin Plan, page 3-40). Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order. The release of hazardous materials has the potential to result in a discharge that exceeds water quality objectives, which is prohibited by the Clean Water Act, the Antidegradation Policy, the Los Angeles Basin Plan, the Dredge or Fill Procedures and Water Code section 13263, Ocean Plan, Thermal Plan, Enclosed Bays and Estuaries Plan, ISWEBE Plan, NPS Pollution Control Program, Water Quality Control Policy for the Enclosed Bays and Estuaries of California, Policy for the Implementation and Enforcement of the NPS Pollution Control Program, Wetlands “No Net Loss” Policy.

In-Water Work

These conditions are required to assure that 1) the discharge shall not adversely affect the beneficial uses of the receiving water or cause a condition of nuisance; 2) the discharge shall comply with all applicable water quality objectives; and 3) treatment and control of the discharge shall be implemented to assure that pollution and nuisance will not occur and the highest water quality is maintained. Accordingly, these conditions require implementation of best practicable treatments and controls to prevent pollution and nuisance, and to maintain water quality. Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order. In-water work has the potential to result in a discharge that exceeds water quality objectives, which is prohibited by the Clean Water Act, the Antidegradation Policy, the Los Angeles Basin Plan, the Dredge or Fill Procedures and Water Code section 13263, Ocean Plan, Thermal Plan, Enclosed Bays and Estuaries Plan, ISWEBE Plan, NPS Pollution Control Program, Water Quality Control Policy for the Enclosed Bays and Estuaries of California, Policy for the Implementation and Enforcement of the NPS Pollution Control Program, Wetlands “No Net Loss” Policy.

Wildlife and Special Status Species

Prior to each qualifying maintenance event, a pre-project eelgrass survey shall be conducted in accordance with the CEMP. If eelgrass is found within the project vicinity, a post-project survey shall be conducted and impacts to eelgrass shall be mitigated.

If work is performed within 500 feet of a California least tern nesting site, the Port shall provide notification to the appropriate agencies.

Pursuant to the California Endangered Species Act (Fish & Wildlife Code, sections 2050 et seq.) and federal Endangered Species Act (16 U.S.C. sections 1531 et set.), the Order does not authorize any act which results in the taking of a threatened, endangered, or candidate species. In the event a Permittee requires authorization from the state or federal authorities, California Code of Regulations, title 23, section 3856(e), requires that copies be provided to the Los Angeles Water Board of “any final and signed federal, state, and local licenses, permits, and agreements (or copies of the draft documents, if not finalized) that will be required for any construction, operation, maintenance, or other actions associated with the activity. If no final or draft document is available, a list of all remaining agency regulatory approvals being sought shall be included.”

Stormwater

Conditions related to stormwater management are required to comply with the Los Angeles Region’s Basin Plan and the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 20090009-DWQ; NPDES No. CAS000002 as amended by Order No. 2010-0014-DWQ, Order No. 2012-0006-DWQ, and any amendments thereto) (General Construction Permit). Post-rain erosion and sedimentation problems can contribute to significant degradation of the waters of the state; therefore, it is necessary to take corrective action to eliminate such discharges to avoid or minimize such degradation. Implementation of control measures and best management practices (BMPs) described in the condition will assure compliance with water quality objectives including floating material, temperature, suspended and settleable material, and turbidity. (Basin Plan, pages 3-33, 3-44, 3-44, 3-46) Water Code section 13264 prohibits any discharge that is not specifically

authorized in this Order. Rain events have the potential to result in a discharge that exceeds water quality objectives, which is prohibited by the Clean Water Act, the Antidegradation Policy, the Los Angeles Basin Plan, the Dredge or Fill Procedures and Water Code section 13263, Ocean Plan, Thermal Plan, Enclosed Bays and Estuaries Plan, ISWEBE Plan, NPS Pollution Control Program, Water Quality Control Policy for the Enclosed Bays and Estuaries of California, Policy for the Implementation and Enforcement of the NPS Pollution Control Program, Wetlands “No Net Loss” Policy.

On-site Mitigation for Temporary Impacts

Conditions in this section related to restoration and/or mitigation of temporary impacts are required by the Dredge or Fill Procedures, which requires "in all cases where temporary impacts are proposed, a draft restoration plan that outlines design, implementation, assessment, and maintenance for restoring areas of temporary impacts to pre-project conditions." (Dredge or Fill Procedures section IV. A.2(d) & B.4.)

Additional authorities applying to this condition include:

- Clean Water Act Section 401 (a discharge shall comply with water quality standards, which are established in Water Quality Control Plans)
- California Water Code section 13263 (discharges must implement water quality control plans and water quality objectives)
- California Code of Regulations, Title 23, section 3859 (conditions shall be added to ensure compliance with water quality standards and other appropriate requirements)
- 40 CFR 230.10 (a) (no discharge permitted if there is a practicable alternative with less impacts)
- 40 CFR 230.10 (b) (discharges may not cause or contribute to violations of water quality standards)
- 40 CFR 230.10 (c) (discharges may not cause degradation)
- 40 CFR 230.12 (conditions shall be included to minimize adverse effects to aquatic ecosystems)
- 40 CFR 230.70 (minimize effects of discharge through various actions)
- 40 CFR 230.71 (minimize effects of discharge through treatment of or limitations on the material)
- 40 CFR 230.72 (effects of discharge may be controlled by containment areas and other best management practices)
- 40 CFR 230.73 (minimize effects of discharged by controlling dispersion)
- 40 CFR 230.74 (minimize effects through use of appropriate equipment and techniques)
- 40 CFR 230.75 (minimize adverse effects on plant and animal populations)
- 40 CFR 230.76 (minimize adverse effects on human use, including timing of discharge)
- 40 CFR 230.77 (control runoff, maintain desired water quality, consider ecological changes)
- 40 CFR 230.91 (take all appropriate and practicable steps to avoid and minimize adverse impacts to waters of the United States)
- 40 CFR Part 230, Subpart J (sections 230.92 *et seq*.) (compensatory mitigation for losses of aquatic resources)
- The National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) (require identifying alternatives to avoid and minimize effects (40 CFR 1500.2 and California Code of Regulations, Title 144, section 15021))

- Dredge or Fill Procedures section IV. A.2(c) (water quality monitoring plan to monitor compliance with water quality objectives)
- Dredge or Fill Procedures, Subpart H (actions to minimize adverse effects)

Attachment E
Locations where maintenance repair activities may be conducted.

Table 1. Locations where maintenance repair activities may be conducted:

Berths	Latitude	Longitude	Berths	Latitude	Longitude
36	33.72500	-118.28083	162	33.76167	-118.26611
41	33.72278	-118.2775	163-164	33.76028	-118.26722
44	33.71639	-118.27694	165-166	33.75778	-118.26778
44	33.71611	-118.27694	167-169	33.75472	-118.26778
45-47	33.71472	-118.27556	171-173	33.75472	-118.26528
49-50	33.71722	-118.27333	174-176	33.75806	-118.2625
51-53	33.72028	-118.27417	177-179	33.76111	-118.26139
54-55	33.72444	-118.27611	180-181	33.76417	-118.26278
56	33.72611	-118.27694	183	33.76583	-118.26333
57	33.72528	-118.27528	184	33.76611	-118.2625
58-60	33.72222	-118.27389	185	33.76611	-118.26167
60	33.72000	-118.27278	186	33.76611	-118.26083
67	33.72028	-118.27111	186-187	33.76528	-118.26035
68	33.72139	-118.27111	188-189	33.76257	118.259617
70-71	33.72500	-118.2725	190	33.76194	-118.25972
72	33.72722	-118.27389	191	33.76500	-118.25889
73A-E	33.72917	-118.27694	194	33.76500	-118.25611
73W-X	33.73028	-118.27722	194	33.76556	-118.25556
74	33.73000	-118.27528	195-199	33.76806	-118.25306
75-77	33.73167	-118.27611	200A	33.77149	-118.25009
78	33.73361	-118.27722	200G-H	33.77611	-118.24444
79-82	33.73611	-118.27833	206-209	33.76306	-118.24861
84	33.73806	-118.27861	210-211	33.76167	-118.25306
84	33.73889	-118.27861	212-221	33.75694	-118.26056
86	33.74083	-118.27838	222-225	33.75028	-118.26806
86	33.74028	-118.27861	227-226	33.74083	-118.27472
87-89	33.74167	-118.27806	238-239	33.73417	-118.27361
90-92	33.74528	-118.27694	240A-B	33.73361	-118.27222
93A-C	33.74778	-118.27694	240X-Z	33.73222	-118.27111
94	33.74861	-118.27444	241	33.729578	-118.27095
95	33.76056	-118.27417	256	33.73056	-118.26833
96	33.75000	-118.27361	258	33.73444	-118.26861
100-102	33.75303	-118.27522	259-260	33.73611	-118.26972
117	33.75683	-118.28333	261-263	33.73778	-118.26861
118-119	22.75611	-118.28056	264	33.73833	-118.26667
120	33.76667	-118.27917	265-267	33.73722	-118.25111
120-121	33.76056	-118.27556	267A	33.73500	-118.25056
127-128	33.76444	-118.27833	268A	33.73492	-118.26592
134-135	33.76778	-118.27778	268B	33.73447	-118.26568
136-139	33.76667	-118.27389	269	33.73500	-118.26389
142-143	33.76333	-118.27194	270-271	33.73194	-118.26361
144-146	33.76056	-118.27306	302-305	33.73278	-118.25583
147	33.75778	-118.27417	401-404	33.73096	-118.25062
148-149	33.75611	-118.27361	405-406	33.72642	-118.25922
150-151	33.75417	-118.27139	Cabrillo Marina	33.71883	-118.27880

153-155	33.75694	-118.27028	Inner Cabrillo Beach	33.71052	-118.28139
161	33.76249	-118.26563			

APPENDIX "G"

MITIGATION MEASURES, MONITORING AND REPORTING PROGRAM

Mitigation Monitoring and Reporting Forms for B49-51 Outer Harbor Cruise Terminal

Spec. No. 2815

- **MM AQ-1: Harbor Craft Engine Standards**
- **MM AQ-2: Dredging Equipment Electrification**
- **MM AQ-3: Fleet Modernization for On-road Trucks**
- **MM AQ-4: Fleet Modernization for Construction Equipment**
- **MM AQ-5: Additional Fugitive Dust Controls**
- **MM AQ-6: Best Management Practices**
- **MM AQ-7: General Mitigation Measure**
- **MM AQ-27: LED Light Bulbs**
- **MM BIO-2: Conduct Nesting Bird Surveys**
- **MM BIO-3: Avoid Marine Mammals**
- **MM BIO-6: Sediment and Dredging**
- **MM CR-3: Stop Work If Unanticipated Cultural Resources Are Identified During Ground Disturbing Activities**
- **MM GEO-1: Emergency Response Planning**
- **MM GW-2: LAHD will prepare a contamination contingency plan for non-specific facilities**
- **MM NOI-1: Construct temporary noise barriers, muffle and maintain construction equipment, prohibit idling, locate equipment, use quiet construction equipment, and notify residents**
- **MM NOI-2: Construction Hours**
- **MM PS-2: Recycle construction materials**
- **MM PS-3: Use Materials with Recycled Content**
- **MM REC-1: Maintain pedestrian access during construction**
- **MM REC-2: Maintain bicycle access during construction**
- **MM REC-3: Maintain parking during construction**
- **MM REC-4: Maintain vehicle access during construction**

- **MM REC-6: Maintain access to open waters of the harbor during construction**
- **MM REC-7: Maintain docking space and dock access during construction**
- **MM TC-1: Develop and implement a Traffic Control Plan throughout proposed project construction**

MM AQ-1: Harbor Craft Engine Standards

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

All harbor craft used during the construction phase of the proposed Project shall, at a minimum, be repowered to meet the cleanest existing marine engine emission standards or EPA Tier 2. Additionally, where available, harbor craft shall meet the proposed EPA Tier 3 (which are proposed to be phased-in beginning 2009) or cleaner marine engine emission standards.

The above harbor craft measure shall be met unless one of the following circumstances exists and the contractor is able to provide proof that any of these circumstances exists:

1. A piece of specialized equipment is unavailable in a controlled form 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; or

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-2: Dredging Equipment Electrification

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

The proposed Project shall use electric dredging equipment.

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-3: Fleet Modernization for On-Road Trucks During Construction

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

1. Trucks hauling materials such as debris or fill will be fully covered while operating off Port property.
2. Idling will be restricted to a maximum of 5 minutes when not in use.
3. Tier Specifications:

   - From January 1, 2024, to December 31, 2026: All on-road heavy-duty diesel trucks with a gross vehicle weight rating (GVWR) of 19,500 pounds or greater used on site or to transport materials to and from the site shall comply with 2012 emission standards, or newer, where available.
   - Post January 1, 2027: All on-road heavy duty diesel trucks used on site or to transport materials to and from the site shall comply with 2015 emission standards, or newer, where available.

   A copy of each unit's certified U.S. Environmental Protection Agency (USEPA) rating, Best Available Control Technology (BACT) documentation, and CARB or South Coast Air Quality Management District (SCAQMD) operating permit shall be provided at the time of mobilization of each applicable unit of equipment.

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: Fleet Modernization for Construction Equipment

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

1. Construction equipment shall incorporate, where feasible, emissions savings technology such as hybrid drives and specific fuel economy standards.
2. Idling shall be restricted to a maximum of 5 minutes when not in use.
3. Tier Specifications:
    - All offroad diesel-powered construction equipment greater than 50 hp shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.

A copy of each unit's certified EPA rating, BACT documentation, and CARB or SCAQMD operating permit shall be provided at the time of mobilization of each applicable unit of equipment.

The construction equipment measures shall be met, unless one of the following circumstances exists and the contractor is able to provide proof that any of these circumstances exists:

- A piece of specialized equipment is unavailable in a controlled form within the state of California, including through a leasing agreement.
- 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.
- 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-5: Fugitive Dust

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

The calculation of fugitive dust (i.e., PM10) from unmitigated Proposed Project earth-moving activities assumes a 75-percent reduction from uncontrolled levels to simulate rigorous watering of the site and use of other measures (listed below) to ensure Proposed Project compliance with SCAQMD Rule 403.

The construction contractor will apply for a SCAQMD Rule 403 Dust Control Permit. The construction contractor will further reduce fugitive dust emissions to 61-percent from uncontrolled levels. The construction contractor will designate personnel to monitor the dust control program and to order increased watering or other dust control measures, as necessary, to ensure a 61-percent control level. Their duties will include holiday and weekend periods when work may not be in progress.

The following measures, at a minimum, must be part of the contractor Rule 403 dust control plan.

1. Active grading sites will be watered one additional time per day beyond that required by Rule 403;

2. Contractors will apply approved nontoxic chemical soil stabilizers to all inactive construction areas or replace groundcover in disturbed areas;

3. Construction contractors will provide temporary wind fencing around sites being graded or cleared;

4. Trucks hauling dirt, sand, or gravel will be covered or will maintain at least 2 feet of freeboard in accordance with Section 23114 of the California Vehicle Code;

5. Construction contractors will install wheel washers where vehicles enter and exit unpaved roads onto paved roads or wash off tires of vehicles and any equipment leaving the construction site;

6. The grading contractor will suspend all soil-disturbing activities when winds exceed 25 miles per hour or when visible dust plumes emanate from a site; disturbed areas will be stabilized if construction is delayed;

7. Trucks hauling materials such as debris or fill will be fully covered while operating off LAHD property;

8. A construction relations officer will be appointed to act as a community liaison concerning onsite construction activity, including resolution of issues related to PM10 generation;

9. All streets will be swept at least once a day using SCAQMD Rule 1186, 1186.1-certified street sweepers or roadway-washing trucks if visible soil materials are carried to adjacent streets;

10. Water or nontoxic soil stabilizer will be applied three times daily to all unpaved parking or staging areas or unpaved road surfaces;

11. Roads and shoulders will be paved; and

12. Water will be applied three times daily or as needed to areas where soil is disturbed.

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: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

The following types of measures are required on construction equipment (including on-road trucks):

1. Use diesel oxidation catalysts and catalyzed diesel particulate traps
2. Maintain equipment according to manufacturers' specifications
3. Restrict idling of construction equipment to a maximum of 5 minutes when not in use
4. Install high-pressure fuel injectors on construction equipment vehicles

LAHD shall implement a process by which to select additional BMPs to further reduce air emissions during construction. The LAHD shall determine the BMPs once the contractor identifies and secures a final equipment list.

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: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

For any of the above mitigation measures (MM AQ-1 through AQ-6), if a CARB-certified technology becomes available and is shown to be as good as or better in terms of emissions performance than the existing measure, the technology could replace the existing measure pending approval by the 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 BIO-2: Conduct Bird Nesting Surveys

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

This measure applies if construction is to occur between February 15 and September 1. Prior to ground-disturbing activities, a qualified biologist will conduct surveys for the presence of black crowned night herons, blue herons, and other nesting birds within Berth 78–Ports O'Call or other appropriate and known locations within the study area that contain potential nesting bird habitat. Surveys will be conducted 24 hours prior to the clearing, removal, or grubbing of any vegetation or ground disturbance. If active nests of species protected under the MBTA and/or similar provisions of the California Fish and Game Code (i.e., native birds including but not limited to the black-crowned night heron) are located, then a barrier installed at a 50–100 foot radius from the nest(s) will be established and the tree/location containing the nest will be marked and will remain in place and undisturbed until a qualified biologist performs a survey to determine that the young have fledged or the nest is no longer active.

Mitigation Monitoring Frequency: During any construction between February 15 and September 1 of every year.

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-27: Light-Emitting Diode (LED) Lightbulbs.

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

All buildings and exterior lighting will use LED light bulbs.

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 BIO-3: Avoid Marine Mammals

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

The contractor will be required to use sound abatement techniques to reduce both noise and vibrations from pile driving activities. Sound abatement techniques will include, but are not limited to, vibration or hydraulic insertion techniques, drilled or augured holes for cast-in-place piles, bubble curtain technology, and sound aprons where feasible. At the initiation of each pile driving event, and after breaks of more than 15 minutes, the pile driving will also employ a "soft-start" in which the hammer is operated at less than full capacity (i.e., approximately 40–60% energy levels) with no less than a 1-minute interval between each strike for a 5-minute period.

Pile driving activities occurring within the Outer Harbor will include establishment of a safety zone, and the area surrounding the operations will be monitored by a qualified marine biologist for pinnipeds. As the disturbance threshold level sound is expected to extend at least 1,000 feet from the steel pile driving operations, a safety zone will be established around the steel pile driving site and monitored for pinnipeds within a 1,200-foot-radius safety zone around the pile. As the steel pile driving site will move with each new pile, the 1,200 foot safety zone will move accordingly. Observers on shore or by boat will survey the safety zone to ensure that no marine mammals are seen within the zone before pile driving of a steel pile segment begins. If marine mammals are found within the safety zone, pile driving of the segment will be delayed until they move out of the area. If a marine mammal is seen above water and then dives below, the biologist will instruct the contractor to wait at least 15 minutes, and if no marine mammals are seen by the biologist in that time, it may be assumed that the animal has moved beyond the safety zone. This 15-minute criterion is based on a study indicating that pinnipeds dive for a mean time of 0.50 minutes to 3.33 minutes; the 15-minute delay will allow a more than sufficient period of observation to be reasonably sure the animal has left the project vicinity.

If pinnipeds enter the safety zone after pile driving of a segment has begun, pile driving will continue. The biologist will monitor and record the species and number of individuals observed, and make note of their behavior patterns. If the animal appears distressed and, if it is operationally safe to do so, pile driving will cease until the animal leaves the area. Pile driving cannot be terminated safely and without severe operational difficulties until reaching a designated depth. Therefore, if it is deemed operationally unsafe by the project engineer to discontinue pile driving activities, and a pinniped is observed in the safety zone, pile driving activities will continue until the critical depth is reached (at which time pile driving will cease) or until the pinniped leaves the safety zone. Prior to the initiation of each new pile driving episode, the area will again be thoroughly surveyed by the biologist.

Mitigation Monitoring Frequency: During all in-water construction activities requiring pile driving.

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 BIO-6. Dispose Sediment

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

Prior to dredging, sediments will be tested for contaminants and if found to meet the sediment quality and quantity criteria for disposal, would be beneficially reused if an appropriate site was identified. If no feasible reuse site is available for uncontaminated sediment disposal, marine disposal would occur. Depending on the test results, sediments will be disposed of at a pre-approved ocean disposal site (LA-2, LA-3), a contained disposal facility in the harbor, or an approved upland location such as the Port's Anchorage Road Upland Soil Storage Site. Disposal in-harbor will only occur if an acceptable disposal site is identified and permitted by the USACE (under Section 404 of the federal CWA). At this time, no in-harbor disposal is foreseeable for the San Pedro Waterfront dredged sediments.

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-3: Stop Work if Unanticipated Cultural Resources are Identified

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

In the event that any artifact or an unusual amount of bone, shell, or non-native stone is encountered during construction, work will be immediately stopped and relocated from that area. The contractor will stop construction within 100 feet of the exposure of these finds until a qualified archaeologist, retained by LAHD in advance of construction, can be contacted to evaluate the find (see 36 CFR 800.11.1 and pertinent CEQA regulations). 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; 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 as appropriate. All construction equipment operators will attend a pre-construction meeting presented by a professional archaeologist retained by LAHD to review types of cultural resources and artifacts that would be considered potentially significant to ensure operator recognition of these materials during construction.

If human remains are encountered, there will be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains. The Los Angeles County Coroner will be contacted to determine the age and cause of death. If the remains are not of Native American heritage, construction in the area may recommence. If the remains are of Native American origin, the most likely descendants of the deceased will be identified by the NAHC. LAHD and the USACE will consult with the Native American most likely descendant(s) to identify a mutually acceptable strategy for treating and disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in PRC Section 5097.98. If the NAHC is unable to identify a most likely descendant; if the descendant fails to make a recommendation within 24 hours of being notified by the NAHC, LAHD, or the USACE; and if the descendant is not capable of reaching a mutually acceptable strategy through mediation by the NAHC, the Native American human remains and associated grave goods will be reburied with appropriate dignity on the proposed project site in a location not subject to further subsurface disturbance.

Mitigation Monitoring Frequency: During initial ground disturbance during 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 GEO-1: Emergency Response Planning

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

The tenants within the proposed project area will work with Port engineers and LAHD police to develop tsunami response training and procedures to assure that construction and operations personnel will be prepared to act in the event of a large seismic event. Such procedures will include immediate evacuation requirements in the event that a large seismic event is felt at the proposed project site, as part of overall emergency response planning for this proposed Project.

Such procedures will be included in any bid specifications for construction or operations personnel, with a copy of such bid specifications to be provided to LAHD, including a completed copy of its operations emergency response plan prior to commencement of construction activities and/or operations.

Mitigation Monitoring Frequency: At beginning of Construction and prior to start of Operation (with annual updates).

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 GW-2: LAHD will prepare a contamination contingency plan for non-specific facilities

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

The project site has a long history of industrial activity, so it is possible that future construction activity could encounter historical soil or groundwater contamination that had not been previously reported to regulatory agencies. The following contingency plan will be implemented to address previously unknown contamination during demolition, grading, and construction:

a) All trench excavation and fill operations will be observed for the presence of chemicals of potential concern and petroleum products. Soils that are suspected to be impacted with chemicals of potential concern and/or petroleum products will be segregated from clean soil. Indications of contaminated/impacted soil may include but are not limited to: discolored soil, petroleum or organic odors, and/or visible sheen. In the event unexpected suspected chemically impacted material (soil or water) is encountered during construction, the contractor will notify LAHD's Chief Harbor Engineer, Director of Environmental Management, and Risk Management's Industrial Hygienist. LAHD will confirm the presence of the suspect material; direct the contractor to remove, stockpile, or contain the material; and characterize the suspect material identified within the boundaries of the construction area. Continued work at a contaminated site will require the approval of the Chief Harbor Engineer.

b) As warranted, appropriate air monitoring equipment (e.g., photoionization detector, combustible gas indicator, organic vapor analyzer, etc.) will be present during grading and/or excavation activities in soils that are suspected to be impacted with chemicals of concern and/or petroleum products.

c) Excavation of VOC-impacted soil will require obtaining and complying with a South Coast Air Quality Management District Rule 1166 permit.

d) The remedial option(s) selected will be dependent upon a number of criteria (including but not limited to types of chemical constituents, concentration of the chemicals, health and safety issues, time constraints, cost, etc.) and will be determined on a site-specific basis. Both off-site and on-site remedial options will be evaluated.

e) The extent of removal actions will be determined on a site-specific basis. At a minimum, the chemically impacted area(s) within the boundaries of the construction area will be remediated to the satisfaction of the lead regulatory agency for the site. The LAHD Project Manager overseeing removal actions will inform the contractor when the removal action is complete.

f) Copies of hazardous waste manifests or other documents indicating the amount, nature, and disposition of such materials will be submitted to the Chief Harbor Engineer within 30 days of project completion.

g) In the event that suspected contaminated soil is encountered, all onsite personnel handling the suspected contaminated material must be trained in accordance with the federal Hazardous Waste Operations and Emergency Response (HAZWOPER) standard. This training provides precautions and protective measures for workers remediating contaminated sites. Workers not certified with HAZWOPER training will not be allowed to resume work in suspected contaminated areas until appropriate site characterization confirms that contaminated soil, groundwater, or soil vapor are not present.

h) As warranted, real-time perimeter and ambient air monitoring stations will be established during all grading, excavation, trenching, and/or soil handling activities associated with contaminated soil.

i) All excavations will be filled with structurally suitable fill material that is free from contamination.

Mitigation Monitoring Frequency: Prior to 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 NOI-1: Construct temporary noise barriers, muffle and maintain construction equipment, prohibit idling, locate equipment, use quiet construction equipment, and notify residents.

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

The following will reduce the impact of noise from construction activities:

a) **Temporary Noise Barriers**. When construction is occurring 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 receivers.

b) **Construction Equipment**. All construction equipment powered by internal combustion engines will be properly muffled and maintained.

c) **Idling Prohibitions**. Unnecessary idling of internal combustion engines near noise sensitive areas will be prohibited.

d) **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.

e) **Quiet Equipment Selection.** Select quiet construction equipment whenever possible. Comply where feasible with noise limits established in the City of Los Angeles Noise Ordinance.

f) **Notification**. Notify residents within 500 feet to the proposed project site of the construction schedule in writing.

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 NOI-2: Construction Hours

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

Construction activities for the proposed Project would not exceed the ambient noise level by 5 dBA at a noise sensitive use between the hours of 6:00 p.m. and 7:00 a.m. Monday through Friday, before 8:00 a.m. or after 6:00 p.m. on Saturday, or at any time on Sunday. If extended construction hours are needed during weekdays under special circumstances, LAHD and the contractor will provide at least 72 hours' notice to sensitive receptors within 0.5 miles of the construction area. Under no circumstances will construction hours exceed the range prescribed by the City of Los Angeles Municipal Code.

Mitigation Monitoring Frequency: During 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 PS-2: Recycle Construction Materials

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

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 PS-3: Use Materials with Recycled Content

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

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 operated on site during construction. Wood from tree removal, not from demolished structures, will be reused as landscape cover, further reducing the quantity of wood that would otherwise be disposed of at solid waste facilities.

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

MM REC-1: Maintain Pedestrian Access During Construction

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

The LAHD and construction contractors will follow standard safety procedures to protect pedestrian traffic from construction hazards, including providing brightly colored fencing and signage indicating closures and safely directing pedestrian traffic around construction areas. This will also require coordinated construction activities such that pedestrian access can be routed around construction with a minimum increase in distance.

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 REC-2: Maintain Bicycle Access During Construction

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

The LAHD and construction contractors will provide signage notifying users of bike lanes of closure as well as signage directing users to alternative bike routes. Alternative bike lanes in the proposed project vicinity include a north-south Class II bike path along the entire length of South Gaffey Street, and an east-west Class III bike path on 9th from North Harbor Boulevard west to State Route 213. LAHD will be required to inform the public prior to commencement of construction resulting in closures or possible disruptions to bike paths. Public sources to notify will, at minimum, include the City of Los Angeles Department of Transportation Bicycle Program, and Los Angeles area bicycling groups.

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 REC-3: Maintain Parking during Construction

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

The LAHD and construction contractors will minimize parking obstructions during construction periods by placing construction areas out of roadways and parking lots, where possible. In areas where construction staging areas and construction activities must impede access to parking areas, detour signs and lane striping will direct traffic to additional off-site parking areas. LAHD will provide shuttle service to remote parking areas in the event that offsite parking areas are farther than 1 mile from existing waterfront areas and the Waterfront Red Car Line does not adequately service the offsite parking 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 REC-4: Maintain Vehicle Access during Construction

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

The LAHD and construction contractors will minimize obstructions to vehicle access during construction periods by placing construction areas out of roadways and parking lots, where possible. In areas where construction staging areas and construction activities must impede access to roadways, detour signs and lane striping will safely direct traffic around construction 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 REC-6: Maintain Access to Open Waters of the Harbor during Construction

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

The LAHD and construction contractors will minimize obstructions to open waters of the harbor during construction periods by placing construction staging areas out of high-traffic waterways, parking lots leading to boat ramps, and boat docks, where possible. LAHD will embark on a public awareness campaign, providing information about construction periods, construction areas, closures, and suggestions of alternative boating areas. LAHD will inform the public prior to commencement of construction that will result in closures or possible disruptions to open waters of the harbor. Public notifications will, at minimum, include notifying local boating groups and posting flyers at boat ramps in the proposed project vicinity. LAHD will offer boater safety training for the public, specifically with respect to safe navigation around construction activities.

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 REC-7: Maintain Docking Space and Dock Access during Construction

Project: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

SECTION I: MITIGATION MEASURE:

The LAHD and construction contractors will minimize obstructions to docking space and dock access during construction periods by placing construction staging areas away from boat docks where possible. LAHD will embark on a public awareness campaign, providing information about construction periods, construction areas, closures, and suggestions of alternative boating areas and docking locations. In cases where docking space will be closed or removed and existing tenants need alternative docking space, LAHD will provide temporary docking space in the near vicinity of the proposed Project. LAHD will provide notification and signage to direct users to these temporary alternative docking areas. LAHD will inform the public prior to commencement of construction that will result in closures or possible disruptions to dock access. Public notifications will, at minimum, include notifying local boating groups and posting flyers at boat ramps in the proposed project vicinity. LAHD will offer boater safety training for the public, specifically with respect to safe navigation around construction activities.

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: B49-51 Outer Harbor Cruise Terminal

Contractor: _____

Application for Port Project Number: 250115-009

State Clearinghouse Number: 2005061041

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 the city and county engineers) before construction. The traffic control plan will include:

- a street layout showing the location of construction activity and surrounding streets to be used as detour routes, including special signage;
- a tentative start date and construction duration period for each phase of construction;
- the name, address, and emergency contact number for those responsible for maintaining the traffic control devices during the course of construction; and
- written approval to implement traffic control from other agencies, as needed.

Additionally, the traffic control plan will include the following stipulations:

- Provide access for emergency vehicles at all times.
- Avoid creating additional delay at intersections currently operating at congested conditions, either by choosing routes that avoid these locations, or constructing during nonpeak times of day.
- Maintain access for driveways and private roads, except for brief periods of construction, in which case property owners will be notified.
- Provide adequate off-street parking areas at designated staging areas for construction-related vehicles.
- Maintain pedestrian and bicycle access and circulation during proposed project construction where safe to do so. If construction encroaches on a sidewalk, a safe detour will be provided for pedestrians at the nearest crosswalk. If construction encroaches on a bike lane, warning signs will be posted that indicate bicycles and vehicles are sharing the roadway.
- Traffic controls may include flag persons wearing Occupational Safety and Health Administration–approved vests and using a "Stop/Slow" paddle to warn motorists of construction activity.
- Maintain access to Metro, LADOT, MAX, PVPTA, and LAHD transit services and ensure that public transit vehicles are detoured.

- Post standard construction warning signs in advance of the construction area and at any intersection that provides access to the construction area.
- Construction warning signs will be posted, in accordance with local standards or those set forth in the Manual on Uniform Traffic Control Devices (Federal Highway Administration 2001) in advance of the construction area and at any intersection that provides access to the construction area.
- During lane closures, notify LAFD and LAPD, as well as the Los Angeles County Sheriff's and Fire Departments, of construction locations to ensure that alternative evacuation and emergency routes are designed to maintain response times during construction periods, if necessary.
- Provide written notification to contractors regarding appropriate routes to and from construction sites, and weight and speed limits for local roads used to access construction sites. Submit a copy of all such written notifications to the City of Los Angeles Planning Department.
- Repair or restore the road right-of-way to its original condition or better upon completion of the work.

Mitigation Monitoring Frequency: Prior to construction activities, to be implemented during 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 "H"

BEST MANAGEMENT PRACTICES PLAN

Addendum No. 2

Spec. No. 2815

BEST MANAGEMENT PRACTICES PLAN

[Project Name]

[CONTRACTOR's NAME]

[SPECIFICATION No.]

1. **Provide BMP Implementation Schedule for Construction Activities**: Examples of activites include but not limited to :Dewatering Operations, Paving Operations, Structure Construction, Painting, Utility Trenches, Concrete, Curb and Gutter work, Demolition, Removals, Storm Drain, Sewer, Materials Delivery and Storage, Material Use, Solid Waste, Hazardous Waste, Concrete Waste, Sanitary/Septic Waste, Vehicle/Equipment Fueling, Vehicle/Equipment Maintenance.

BMP Implementation Schedule

	BMP	Implementation	Duration
Erosion Control	EC-1, Scheduling	Prior to Construction	Entirety of Project
Sediment Controls	TC-1, Stabilized Construction Entrance		
Waste Management	WM-1 , Material Delivery and Storage		
	WM-8 , Concrete Waste Management		
Non-Storm Water Management Non-Storm Water	NS-10, Vehicle and Equipment Maintenance		

SAMPLE

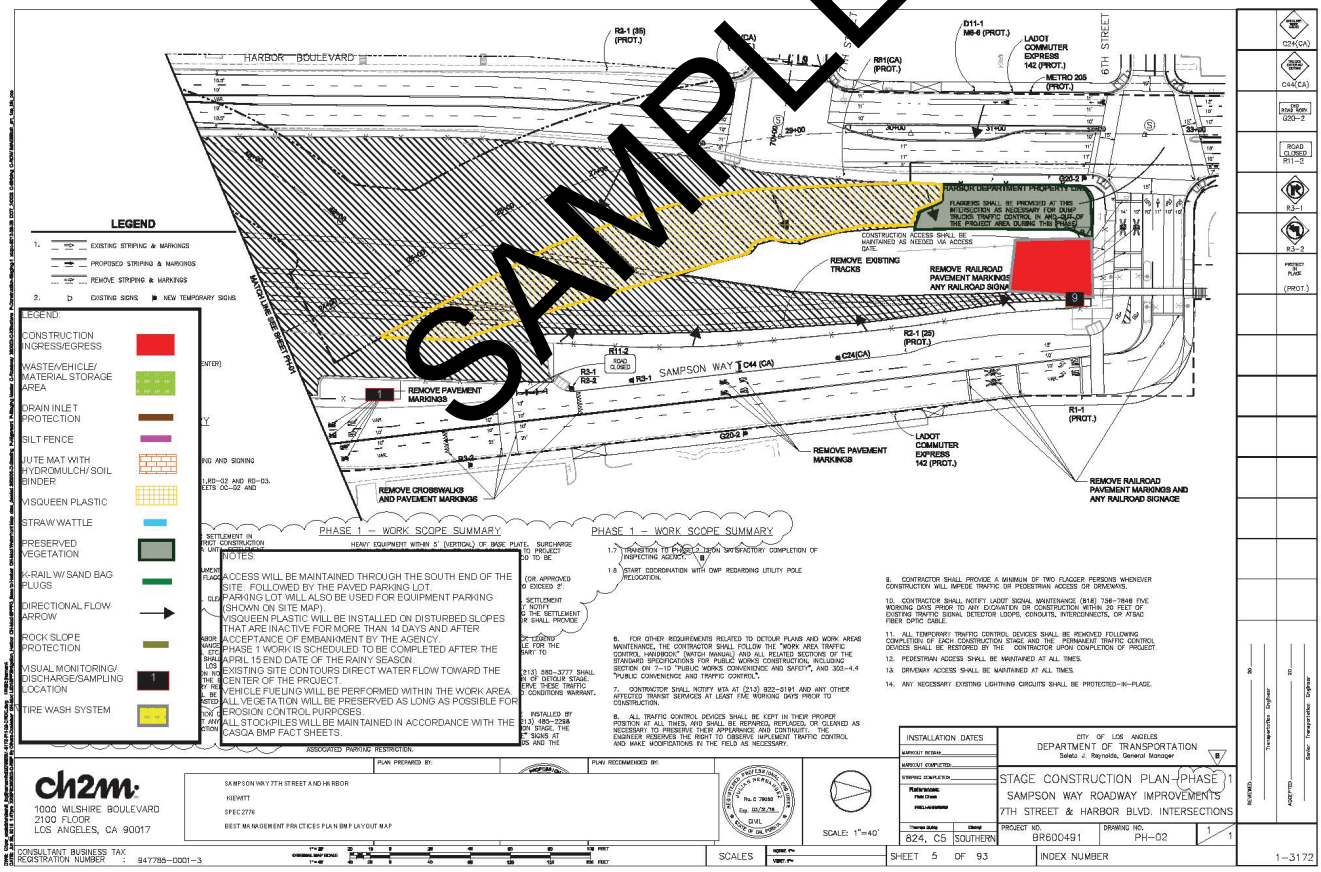
Please fill out the BMP Implementation form completely and add to the list as needed.

2. **Provide BMP Layout Map**

Required BMP Map Information

Included on Map/Plan Sheet No.	Required Element
	The project's surrounding area(Vicinty)
	Site Layout
	Construction site boundaries
	Active Areas
	Locations of erosion control BMPs
	Locations of sediment control BMPs
	Locations of runoff and storm drain inlet BMPs
	Location of all post construction BMPs
	Waste storage areas
	Vehicle storage areas
	Material storage areas
	Entrance and Exits
	Fueling Locations

BMP LAYOUT MAP(Minimum Size (11X17)



Addendum No. 2

APPENDIX "I"

FABRICATOR LIST

Addendum No. 3

Spec. No. 2815

FABRICATOR LIST (STEEL PIPE PILES)

A qualified Steel Pipe Pile fabricator shall be one of the following:

1. An approved fabricator by City of Los Angeles Department of Building and Safety (LADBS).

2. Participate in American Institute of Steel Construction (AISC) Quality Management Systems (QMS) Certification and is currently designated as a Certified Fabricator through AISC's Certification Program.

3. Possess an API Monogram License for API Spec 5L.

Please check the appropriate box from the list above. ~~Photocopy this form for additional firms.~~

Fabricator Name and Location		1	2	3
Name		☐	☐	☐
Address				
City, State, Zip				
Phone				
Description of Items Being Fabricated: Steel Pipe Piles				

Name		☐	☐	☐
Address				
City, State, Zip				
Phone				
~~**Description of Items Being Fabricated: Steel Pipe Piles**~~				