Appendix E2
Dispersion Modeling of Criteria Pollutants

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Appendix E2
Dispersion Modeling of Criteria Pollutants for the Port of Los Angeles Berth 97-109 Container Terminal Project

E2.1 Introduction

This document describes the methods and results of air dispersion modeling that predict the ground-level concentrations of criteria pollutants resulting from construction and operation of the Port of Los Angeles (POLA) Container Terminal Project at Berth 97-109.

The air dispersion modeling was performed using the U.S. Environmental Protection Agency's (USEPA) AERMOD Modeling System, version 07026, based on the Guideline on Air Quality Models (40 Code of Federal Regulations [CFR], Part 51, Appendix W, November 2005). Criteria pollutants, including nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter equal or less than 10 microns in diameter (PM_{10}), and particulate matter equal or less than 2.5 microns in diameter ($PM_{2.5}$) were modeled for the CEQA and NEPA baselines and Project alternatives. The predicted ground-level concentrations were compared to the relevant South Coast Air Quality Management District (SCAQMD) air quality significance thresholds to determine the air quality impacts of the project.

E2.2 Development of Emission Scenarios Used in the Air Dispersion Modeling

E2.2.1 Construction Emission Sources

Project construction activities would involve the use of:

- Off-road construction equipment
- On-road trucks
- Tugboats
- General cargo ships

In accordance with SCAQMD guidance, only onsite construction emission sources were modeled for criteria pollutant impacts (SCAQMD, 2005b). Onsite emissions sources included fugitive dust, onsite construction equipment, onsite haul trucks, and general cargo ship hoteling (for shoreside gantry crane delivery). Offsite truck hauling, general cargo ship transit, and tugboat/barge activity are considered offsite and were not modeled for construction.

Construction modeling was performed for mitigated Phase I, unmitigated Phases II and III, and mitigated Phases II and III. Unmitigated Phase I was not modeled because Phase I has already been completed and mitigation (emulsified fuel in the derrick barges during pile driving) was implemented.

E2.2.2 Construction Emissions

Maximum 24-hour Emissions: Maximum daily (24-hour) emissions from construction on the terminal were calculated by first calculating daily emissions from individual construction activities (for example, wharf construction, marine terminal crane delivery, or backlands construction). Maximum daily emissions then were determined by summing emissions from overlapping construction activities as indicated in the proposed construction schedule (Table 2-2) of the EIS/EIR.

Maximum 1-hour and 8-hour Emissions: The construction schedule is assumed to be 10 hours per day, 6 days per week, and 52 weeks per year. Daily construction activities were assumed to be constant throughout the workday. Therefore, the maximum 1-hour emissions were estimated by dividing the maximum daily emission rates by 10 hours, except for ship hoteling emissions, which were divided by 24 hours. The same emission rates, on a per-hour basis, were used for the 8-hour averaging period.

A summary of the construction emissions used in the AERMOD modeling for the proposed Project is provided in Table E2.2-1. The emissions used in this AERMOD modeling differ from the construction emissions summarized in Section 3.2 of the EIS/EIR because the offsite emissions were not included in the AERMOD dispersion modeling. In addition, onsite truck speed was assumed to be 10 miles per hour, which was different than the offsite speeds.

E2.2.3 Operational Emission Sources

As requested by the SCAQMD, both onsite and offsite emission sources were included in the modeling of operational emissions. The following operational emission sources were included in the air dispersion modeling for NO_2, CO, PM_{10}, and $PM_{2.5}$. Detailed descriptions of the sources and their emissions are discussed in Section 2 of Appendix E3 (Health Risk Assessment Report) and Section 3.4.2 of the EIS/EIR.

- **Ships transiting** to and from the berth. Ship transit in SCAQMD waters consists of fairway transit, Precautionary Area transit, harbor transit, turning, and docking. The ship emission sources include the main propulsion engine, auxiliary engines, and boiler.
- **Ships hoteling** while at berth. Hoteling emission sources include the ship auxiliary engines and boiler; the main propulsion engine is turned off during hoteling.
- **Tugboats** used to assist the container ships between the POLA breakwater and the berth (two tugboats per ship assist). Emission sources include the main propulsion and auxiliary engines of tugboats.
- **Rail Yard Equipment (Cargo Handling Equipment)**, including yard tractors and top picks.
- **Locomotives** switching and idling at the Berth 121-131 rail yard, and hauling trains between the Berth 121-131 rail yard and the Alameda Corridor, as far north as the Anaheim Street.

Table E2.2-1. Peak Construction Emissions Associated with the Proposed Project

Construction Phases	Construction Sources	NO_X 1-hour average (lb/hr)	CO 1-hour average (lb/hr)	CO 8-hour average (lb/hr)	PM_{10} 24-hour average (lb/hr)	$PM_{2.5}$ 24-hour average (lb/hr)
Phase I with mitigation	Equipment and Vehicle Exhaust	33.95	14.32	14.32	1.59	1.46
	Fugitive Dust	—	—	—	19.36	4.04
	Ship Hoteling	13.15	0.99	0.99	2.04	1.63
Phases II and III without mitigation	Equipment and Vehicle Exhaust	25.22	9.16	9.16	0.87	0.80
	Fugitive Dust	—	—	—	6.72	1.40
	Ship Hoteling	13.15	0.99	0.99	2.04	1.63
Phase II and III with mitigation	Equipment and Vehicle Exhaust	19.35	8.84	8.84	0.30	0.27
	Fugitive Dust	—	—	—	2.69	0.56
	Ship Hoteling	13.15	0.99	0.99	2.04	1.63

Notes:

[a] Phase I concentrations were not modeled without mitigation because mitigation was implemented during Phase I.

[b] Construction schedules are assumed to be 10 hours per day for all construction equipments and vehicles. Ships hoteling are assumed to be 24 hours per day.

[c] In accordance with SCAQMD guidance, ship transit emissions, tugboat emissions, and offsite haul-truck transport emissions are considered offsite emissions and were not included in the modeling (SCAQMD, 2005b). However, ship hoteling and onsite truck emissions are considered onsite emissions and, therefore, were included in the modeling. Onsite trucks were assumed to travel 1 mile at a speed of 10 miles per hour.

[d] Mitigation measures for construction are described in Section 3.2.4.3 of the EIS/EIR.

- **Truck** emissions from off-terminal and on-terminal driving, and idling at the Berth 121-131 in-gate and the Berth 97-109 Terminal. Based on the results of a sensitivity analysis, emissions from roadways farther from the terminal area, including State Route (SR)-47 from the Vincent Thomas Bridge to Seaside Avenue, I-110 north of Anaheim Street, Alameda Street north of Anaheim Street, Sepulveda Boulevard east of Alameda Street, and Anaheim Street east of Alameda Street have negligible impacts compared to the other sources at or near POLA and, therefore, were not included in the air dispersion modeling.
- **Terminal Equipment (Cargo Handling Equipment)**, including yard tractors, rubber-tired gantry cranes (RTGs), top picks, side picks, forklifts, and other miscellaneous equipment.

E2.2.4 Operational Emissions

To evaluate the air quality impacts of project operations, peak operational emissions were calculated for the project analysis years of 2005, 2010, 2015, 2030, and 2045. To ensure the capture of maximum concentrations, the highest emissions from each source grouping were conservatively modeled together in AERMOD, even if the emissions would occur in different analysis years for different source groupings. The source groupings included (1) ships and tugboats in transit, (2) ships hoteling, (3) locomotives and rail yard equipment, and (4) trucks, and (5) terminal equipment.

The dispersion modeling analysis for project operations also included construction emissions during the period of overlap between construction and operations. Specifically, the peak construction emissions from Phases II and III of construction were added to the 2010 operational emissions prior to selecting and modeling the highest emissions for each source grouping.

Operational emissions for the various modeled averaging times were derived as follows:

E2.2.4.1 Marine Vessels (Ships and Tugboats)

Annual Emissions: Annual emission rates of marine vessels were estimated based on the projected number of ship calls during each year. Detailed calculation methods are described in *Section 3.4.2.1: Methodology for Determining Operational Emissions* of the EIS/EIR.

Maximum 24-Hour Emissions: Emission rates of marine vessels during a 24-hour period were calculated for PM_{10} and $PM_{2.5}$ emissions based on worst-case activities that could occur during a day. The worst case 24-hour emissions scenario conservatively assumed 24 hours of continuous hoteling at both berths, plus one ship arrival and one ship departure during the same period. For those scenarios where only one berth would be active (such as Alternatives 3 and 5), the worst case 24-hour emissions scenario conservatively assumed 24 hours of continuous hoteling at one berth, plus one ship arrival during the same period.

The analysis also assumed the largest ship sizes anticipated in the fleet that could be accommodated simultaneously at the terminal. Without mitigation, each ship was conservatively assumed to use residual fuel with a 4.5 percent sulfur content. A 4.5 percent sulfur content represents the sulfur cap set by the International Maritime Organization (IMO) for marine fuel. By contrast, the calculations for annual ship emissions assume residual fuel with a 2.7 percent sulfur content, which represents the worldwide average sulfur content used by ships (Entec, 2002).

Maximum 1-Hour Emissions: Maximum 1-hour emission rates were calculated for NO_X and CO based on assumptions regarding worst-case activities that could occur simultaneously during a single hour. For marine vessels, two possible worst-case hourly activity scenarios were considered, and the scenario yielding the highest impact was reported:

1. One ship is hoteling while a second ship is maneuvering, turning, and docking (with assistance from two tugboats) during the same hour; and
2. Two ships are hoteling at adjacent berths during the same hour

For those scenarios where only one berth would be active (such as Alternatives 3 and 5), the two modeled scenarios were (1) one ship is hoteling; and (2) one ship is maneuvering, turning, and docking (with assistance from two tugboats).

The analysis assumed the largest ship sizes (and, therefore, with the greatest emissions) anticipated in the fleet that could be accommodated simultaneously at the terminal.

As an additional conservative measure, each ship was assumed to use residual fuel with a 4.5 percent sulfur content during the unmitigated worst case 1-hour scenario.

Maximum 8-Hour Emissions: Emission rates during an 8-hour period were calculated for CO emissions based on assumptions regarding worst-case activities that could occur during an 8-hour period. The worst case 8-hour emissions scenario conservatively assumed 8 hours of continuous hoteling at both berths, plus one ship arrival and one ship departure during the same period. For those scenarios where only one berth would be active (such as Alternatives 3 and 5), the worst case 8-hour emissions scenario conservatively assumed 8 hours of continuous hoteling at one berth, plus one ship arrival during the same period.

The analysis also assumed the largest ship sizes anticipated in the fleet that could be accommodated simultaneously at the terminal. Without mitigation, each ship was conservatively assumed to use residual fuel with a 4.5 percent sulfur content.

The CEQA baseline, NEPA baseline, Alternative 1, and Alternative 2 would have no ship activity associated with Berth 97-109 Terminal operations. However, Alternatives 1 and 2 would have brief construction-related ship activity associated with shoreside gantry crane removal.

E2.2.4.2 Rail Yard Equipment, Locomotives, and Trains

Annual Emissions: Annual emissions from rail yard equipment, locomotives, and trains were estimated following the methodologies described in *Section 3.4.2.1: Methodology for Determining Operational Emissions* of the EIS/EIR, based on the projected annual activity levels and emission factors of the analysis years.

Maximum 24-Hour Emissions: In 2005, 2010, and 2015, the peak day scenario for the Berth 121-131 (on-dock) rail yard for the proposed Project assumes that the equivalent of one 4-locomotive train carrying only project-generated cargo arrives and is completely disassembled, and a second 4-locomotive train carrying only project-generated cargo is fully assembled and departs. In 2030 and 2045, the peak day scenario for the Berth 121-131 (on-dock) rail yard for the proposed Project assumes that the equivalent of two 4-locomotive trains carrying only project-generated cargo arrive and are completely disassembled, and two additional 4-locomotive trains carrying only project-generated cargo are fully assembled and depart.

The peak day rail scenarios for Alternatives 3, 4, and 5 are described in Impact AQ-3 in the EIS/EIR for each alternative.

Maximum 1-Hour Emissions: Activity at the Berth 121-131 rail yard during the worst-case hour assumed one train being assembled and one train being disassembled at the same time. The train assembly would involve one yard locomotive, four line-haul locomotives, seven yard tractors, and two top picks. The train disassembly would also involve one yard locomotive, four line-haul locomotives, seven yard tractors, and two top picks. During the same hour, one 4-locomotive train was assumed to depart from the rail yard, and a second 4-locomotive train was assumed to arrive at the rail yard.

Maximum 8-Hour Emissions: Activity at the Berth 121-131 rail yard during the worst-case 8-hour period assumed one 4-locomotive train is fully assembled and another 4-locomotive train is fully disassembled. During the same period, one 4-locomotive train was assumed to depart from the rail yard, and a second 4-locomotive train was assumed to arrive at the rail yard.

The CEQA baseline, NEPA baseline, Alternative 1, Alternative 2, and Alternative 6 would have no rail activity associated with the Berth 121-131 rail yard.

E2.2.4.3 Trucks

Emissions from trucks include trucks driving and idling on-terminal, and trucks driving off-terminal.

Annual Emissions: Annual emissions from trucks were estimated using the methodologies described in *Section 3.4.2.1: Methodology for Determining Operational Emissions* of the EIS/EIR, based on the projected annual truck trips and emission factors of the analysis years.

Maximum 24-Hour Emissions: Peak day truck trips generated by the proposed Project were provided by the traffic study for each analysis year. The peak day represents a weekday during a peak month of container throughput. This equates to about 33 percent more truck trips on the peak day compared to an average day for 2005, 2010, and 2015, and about 22 percent more truck trips than an average day for 2030 and 2045. The peaking factor is lower in 2030 and 2045 because port activities are assumed to be more evenly spread out during the year because of the higher throughput (that is, all months are assumed to be equally busy).

Maximum 1-Hour and 8-Hour Emissions: Maximum 1-hour and 8-hour emissions were derived from the maximum 24-hour emissions by applying diurnal emission scalars published by CARB in the *Diesel Particulate Matter Exposure Assessment Study for the Ports of Los Angeles and Long Beach* (April 2006). Specifically, for off-terminal trucks, these scalars assume that 80 percent of truck emissions occur from 6 a.m. to 6 p.m., and 20 percent occur from 6 p.m. to 6 a.m.

The CEQA baseline, NEPA baseline, Alternative 1, and Alternative 2 would have no truck activity associated with the Berth 97-109 Terminal.

E2.2.4.4 Terminal Equipment

Annual Emissions: Annual emissions from terminal equipment were estimated using the methodologies described in *Section 3.4.2.1: Methodology for Determining Operational Emissions* of the EIS/EIR, based on the projected annual usage and emission factors of the analysis years.

Maximum 24-Hour Emissions: A peak day factor for terminal equipment was developed by determining the maximum number of TEUs that could be moved in a day relative to the annual TEU throughput. The maximum daily TEU throughput is a composite of the peak day activity at the wharf (ship loading and unloading), gate (truck trips), and Berth 121-131 (on-dock) rail yard (train loading and unloading). Peak daily container throughput at the wharf was calculated assuming all available cranes at the wharf would be simultaneously loading and unloading containers from ships. For the proposed Project, the number of available cranes would be 4 in 2005, 9 in 2010, and 10 in 2015 and beyond. Peak daily container throughputs at the gate and on-dock rail yard were determined based on the peak daily truck and train trips, described in the preceding paragraphs. The resulting peak day factors for terminal equipment for the proposed Project, relative to an average day of activity, were estimated to be 2.5 for 2005, 3.8 for 2010, 2.5 for 2015, and 2.3 for 2030 and 2045.

The peak day terminal equipment scenarios for the CEQA baseline and NEPA baseline are described in Sections 3.2.2.3 and 3.2.4.1 (“NEPA Impact Determination”), respectively, in the EIS/EIR. The peak day terminal equipment scenarios for Alternatives 1, 2, 3, 4, 5, and 6 are described in Impact AQ-3 in the EIS/EIR for each alternative.

Maximum 1-Hour and 8-Hour Emissions: Maximum 1-hour and 8-hour emissions were derived from the maximum 24-hour emissions by applying diurnal emission scalars published by CARB in the *Diesel Particulate Matter Exposure Assessment Study for the Ports of Los Angeles and Long Beach* (April 2006). Specifically, for terminal equipment, these scalars assume that 80 percent of emissions occur from 8 a.m. to 5 p.m., 15 percent occur from 5 p.m. to 3 a.m., and 5 percent occur from 3 a.m. to 8 a.m.

E2.2.4.5 Summary of Operational Emissions

Tables E2.2-2 through E2.2-6 present the operational emissions by source for the Proposed Project, Mitigated Project, No Project (Alternative 1), NEPA baseline, and CEQA baseline, respectively.

Table E2.2-2. Peak NO_X, CO, PM_{10}, and $PM_{2.5}$ Operational Emissions by Source – Proposed Project

Emission Source	1-hour NO_X (lb/hr)	Annual NO_X (ton/yr)	1-hour CO (lb/hr)	8-hour CO (lb/8-hr)	24-hour PM_{10} (lb/day)	24-hour $PM_{2.5}$ (lb/day)
Ships – Transita,b,c	4.6E+02	6.5E+02	5.7E+01	6.7E+02	9.2E+02	7.4E+02
Ships – Hoteling c	6.1E+01	2.3E+02	4.6E+00	7.8E+01	4.8E+02	3.8E+02
Tugboats	6.0E+01	1.0E+01	9.3E+00	2.1E+01	3.9E+00	3.6E+00
Terminal Equipment d	3.3E+02	2.7E+02	4.0E+02	3.2E+03	2.0E+02	1.6E+02
Railyard Equipment	3.3E+01	1.0E+01	1.3E+01	7.1E+01	8.4E+00	7.7E+00
Locomotives	9.8E+01	1.1E+01	1.4E+01	1.6E+01	4.5E+00	4.1E+00
Trucks – On Terminal d	2.2E+01	3.4E+01	1.3E+01	1.0E+02	1.1E+01	9.6E+00
Trucks – Off Terminal	3.5E+01	7.1E+01	1.5E+01	1.2E+02	2.2E+01	1.9E+01
Total – All Sources	**1.1E+03**	**1.3E+03**	**5.3E+02**	**4.3E+03**	**1.7E+03**	**1.3E+03**

Note:

[a] Because worst-case 1-hour emission scenarios involve ships maneuvering and hoteling near the terminal, no Fairway or Precautionary Area transit emissions would occur during the worst-case hour. Therefore, 1-hour NO_X and 1-hour CO emissions for ship transit include only harbor transit, turning, and docking emissions. All other averaging periods include fairway, precautionary area, harbor transit, turning, and docking emissions.

[b] For annual NO_X, 8-hour CO, 24-hour PM_{10}, and 24-hour $PM_{2.5}$, the ship transit emissions presented in this table include transit to the edge of the SCAQMD overwater boundary (a 53 nm distance). Of this distance, only the nearest 26 nm to the berth were included in the dispersion modeling. The remaining, more distant, portion of ship transit was not included in the modeling because it contributes less than 1 percent to the concentrations at the maximum impacted receptors.

[c] The 1-hour NO_X and 1-hour CO emissions for ship transit and ship hoteling reflect a worst case scenario of one ship hoteling and another ship arriving during the same hour. This scenario produced higher concentrations than 2 ships hoteling and no ships arriving.

[d] Phase II/III construction emissions are included with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.2-3. Peak NO_X, CO, PM_{10}, and $PM_{2.5}$ Operational Emissions by Source – Mitigated Project

Emission Source	1-hour NO_X (lb/hr)	Annual NO_X (ton/yr)	1-hour CO (lb/hr)	8-hour CO (lb/8-hr)	24-hour PM_{10} (lb/day)	24-hour $PM_{2.5}$ (lb/day)
Ships – Transit a,b,c	3.5E+02	2.6E+02	5.7E+01	4.1E+02	4.0E+02	3.2E+02
Ships – Hoteling c	6.1E+01	4.2E+01	4.6E+00	7.4E+01	4.6E+02	3.7E+02
Tugboats	6.0E+01	1.0E+01	9.3E+00	2.1E+01	3.9E+00	3.6E+00
Terminal Equipment d	4.8E+02	2.5E+02	2.4E+03	2.0E+04	1.2E+02	8.7E+01
Railyard Equipment	3.3E+01	1.0E+01	1.2E+01	6.7E+01	8.4E+00	7.7E+00
Locomotives	9.8E+01	6.2E+00	1.4E+01	1.6E+01	4.5E+00	4.1E+00
Trucks – On Terminal d	1.9E+01	2.9E+01	8.5E+00	6.8E+01	8.6E+00	7.8E+00
Trucks – Off Terminal	2.1E+01	4.3E+01	1.1E+01	8.5E+01	1.6E+01	1.5E+01
Total – All Sources	**1.1E+03**	**6.6E+02**	**2.6E+03**	**2.0E+04**	**1.0E+03**	**8.1E+02**

Note:

[a] Because worst-case 1-hour emission scenarios involve ships maneuvering and hoteling near the terminal, no Fairway or Precautionary Area transit emissions would occur during the worst-case hour. Therefore, 1-hour NO_X and 1-hour CO emissions for ship transit include only harbor transit, turning, and docking emissions. All other averaging periods include fairway, precautionary area, harbor transit, turning, and docking emissions.

[b] For annual NO_X, 8-hour CO, 24-hour PM_{10}, and 24-hour $PM_{2.5}$, the ship transit emissions presented in this table include transit to the edge of the SCAQMD overwater boundary (a 53-nm distance). Of this distance, only the nearest 26 nm to the berth were included in the dispersion modeling. The remaining, more distant, portion of ship transit was not included in the modeling because it contributes less than 1 percent to the concentrations at the maximum impacted receptors.

[c] The 1-hour NO_X and 1-hour CO emissions for ship transit and ship hoteling reflect a worst-case scenario of one ship hoteling and another ship arriving during the same hour. This scenario produced higher concentrations than two ships hoteling and no ships arriving.

[d] Phase II/III construction emissions are included with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.2-4. Peak NO_X, CO, PM_{10}, and $PM_{2.5}$ Operational Emissions by Source – Alternative 1 (No Project)

Emission Source	1-hour NO_X (lb/hr)	Annual NO_X (ton/yr)	1-hour CO (lb/hr)	8-hour CO (lb/8-hr)	24-hour PM_{10} (lb/day)	24-hour $PM_{2.5}$ (lb/day)
Ships – Hoteling a	1.3E+01	1.3E+00	9.9E-01	8.0E+00	4.9E+01	3.9E+01
Terminal Equipment	2.6E+02	2.0E+02	1.2E+03	9.6E+03	5.3E+01	5.0E+01
Total – All Sources	**2.7E+02**	**2.0E+02**	**1.2E+03**	**9.6E+03**	**1.0E+02**	**9.0E+01**

Note:

[a] For Alternative 1, ship hoteling emissions are associated with the removal of shoreside gantry cranes via general cargo ship during project construction.

Table E2.2-5. Peak NO_X, CO, PM_{10}, and $PM_{2.5}$ Operational Emissions by Source – NEPA Baseline

Emission Source	1-hour NO_X (lb/hr)	Annual NO_X (ton/yr)	1-hour CO (lb/hr)	8-hour CO (lb/8-hr)	24-hour PM_{10} (lb/day)	24-hour $PM_{2.5}$ (lb/day)
Terminal Equipment a,b	3.1E+02	2.3E+02	1.4E+03	1.1E+04	9.6E+01	6.5E+01
Total – All Sources	**3.1E+02**	**2.3E+02**	**1.4E+03**	**1.1E+04**	**9.6E+01**	**6.5E+01**

Note:

[a] For the NEPA baseline, only terminal equipment emissions are associated with the Berth 97-109 Terminal.

[b] Phase II/III construction emissions are included with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.2-6. Peak NO_X, CO, PM_{10}, and $PM_{2.5}$ Operational Emissions by Source – CEQA Baseline

Emission Source	1-hour NO_X (lb/hr)	Annual NO_X (ton/yr)	1-hour CO (lb/hr)	8-hour CO (lb/8-hr)	24-hour PM_{10} (lb/day)	24-hour $PM_{2.5}$ (lb/day)
Terminal Equipment a	1.4E+02	1.0E+02	5.4E+01	4.3E+02	8.5E+01	7.8E+01
Total – All Sources	**1.4E+02**	**1.0E+02**	**5.4E+01**	**4.3E+02**	**8.5E+01**	**7.8E+01**

Note:

[a] For the CEQA baseline, only terminal equipment emissions are associated with the Berth 97-109 Terminal. There are no construction emissions associated with the CEQA baseline.

E2.3 Dispersion Model Selection and Inputs

The air dispersion modeling was performed using the USEPA AERMOD dispersion model, version 07026, based on the *Guideline on Air Quality Models* (40 CFR, Part 51, Appendix W; April 15, 2003). The AERMOD model is a steady-state, multiple-source, Gaussian dispersion model designed for use with emission sources situated in terrain where ground elevations can exceed the stack heights of the emission sources. The AERMOD model requires hourly meteorological data consisting of wind vector, wind speed, temperature, stability class, and mixing height. The AERMOD model allows input of multiple sources and source groupings, eliminating the need for multiple model runs. The selection of the AERMOD model is well suited based on (1) the general acceptance by the modeling community and regulatory agencies of its ability to provide reasonable results for large industrial complexes with multiple emission sources, (2) a consideration of the availability of annual sets of hourly meteorological data for use by AERMD, and (3) the ability of the model to handle the various physical characteristics of project emission sources, including, “point,” “area,” and “volume” source types. AERMOD is a USEPA-approved dispersion model, and the SCAQMD approves of its use for mobile source analyses.

E2.3.1 Emission Source Representation

E2.3.1.1 Construction Emission Sources

The construction emission sources in AERMOD were determined separately for Phase I and combined Phases II and III based on the footprint size of the construction areas. All construction equipment and vehicle emission sources were modeled as volume sources, and their emissions were distributed uniformly throughout these construction areas. Hoteling cargo ships delivering shoreside gantry cranes were modeled as stationary point sources.

The source release parameters used in the AERMOD modeling for construction emissions are shown in Table E2.3-1.

Table E2.3-1. AERMOD Source Release Parameters – Construction Emissions

Source Type	Source Description	AERMOD Source Type	No. of Sources Represented	Release Height (feet)	Source Width (m)
Terminal Construction	Construction Equipment	Volume	83	15 [a]	Various [b]
	Fugitive Dust	Volume	83	3.3 [a]	Various [b]
	Ship Hoteling	Point	2	122	N/A

Notes:

[a] A 15-foot-release height was used for trucks and construction equipment exhaust. Fugitive dust emissions were modeled at a release height of 1 meter.

[b] Volume sources covering the terminal construction areas range in width from 50 to 250 meters.

[c] Cargo ship hoteling sources were modeled using the point source parameters described in Table E2.3-2 for boilers and auxiliary engines <3,000 TEU ship size.

E2.3.1.2 Operational Emission Sources

The AERMOD modeling analysis evaluated project-related operational emission sources, including container ships, assist tugboats, terminal and rail yard equipment, locomotives, and trucks. Emissions from the movement of vessels in the shipping lanes, trains on rail lines, and trucks on roadways are line source emissions that were simulated and modeled as a series of separated volume sources. Mobile source operations confined within specific geographic locations, such as the Berth 97-109 Terminal or the Berth 121-131 (on-dock) rail yard, were modeled as a collection of volume sources covering the area. Finally, stationary emissions from hoteling ships were modeled as stationary point (stack) sources with upward plume velocity and buoyancy.

The operational characteristics of each source type in terms of area of operation and vertical stack height or source height determined the release parameters of each volume or point source. The specific methodology for defining the sources is summarized below. Detailed descriptions of the parameters defining each source are described in Section 4.1 of Appendix E3, Health Risk Assessment Report.

1. **Ship Transit Lanes (Fairway, Precautionary Area, and Harbor Transit)**. Emissions from marine vessels that transit between the offshore shipping lanes and the berth were simulated as a series of separated volume sources beginning

approximately 15 nautical miles (nm) beyond Point Fermin and extending to the Berth 97-109 wharf. Total transit emissions were calculated and divided equally among the volume sources for each of the Fairway, Precautionary Area, and Harbor Transit segments. Tug assist emissions were also included in the Harbor Transit volume sources.

2. **Vessel Berth Maneuvering Area (Turning and Docking)**. Ship Turning and Docking represent activities with concentrated emissions that occur in designated locations near the berth. As a result, dedicated volume sources were created to simulate these activities.

3. **Vessel Hoteling Locations**. Because the vessels are stationary, hoteling emission sources were modeled as stack-type point sources located adjacent to Berths 97-109.

4. **Terminal and Rail Yard Areas.** The areas of the Berth 97-109 Terminal, truck in-gate (at the Berth 121-131 Terminal), and Berth 121-131 rail yard were overlain with square boxes of various sizes to achieve complete coverage of the surface areas where the sources operate. The emissions were assumed to be spread uniformly over the entire area represented by the volume sources.

5. **Roadways and Railways.** Truck movements on roadways and train movements on rail lines were modeled as a series of separated volume sources, as recommended for the simulation of line sources in the ISCST3 User's Guide (USEPA, 1995).

Emission sources were positioned by using the Universal Transverse Mercator (UTM) coordinate system (NAD-27) referenced to topographic data obtained from the U.S. Geological Survey (USGS). The source release parameters used in the AERMOD modeling for operational emissions were shown in Table E2.3-2.

Table E2.3-2. AERMOD Source Release Parameters – Operational Emissions

Source Type	Source Description	AERMOD Source Type	No. of Sources	Release Height (feet)	Source Width (m)	Line Source Spacing (m)	Exit Velocity (fpm)	Exit Temp. (°F)	Stack Diam. (feet)
Ships	Fairway Transit	Volume	48	161 [f]	300	600	—	—	—
	Precautionary Area Transit	Volume	32	161 [f]	300	600	—	—	—
	Harbor Transit	Volume	33	194 [f]	100	200	—	—	—
	Turning	Volume	1	258 [f]	300	600	—	—	—
	Docking	Volume	1	258 [f]	300	600	—	—	—
	Hoteling Auxiliary Engines <3,000 TEU ship size	Point	2 [a]	122	—	—	1,815	572	1.28
	Hoteling Auxiliary Engines 3,000-5,000 TEU ship size	Point	2 [a]	118	—	—	1,516	581	1.54
	Hoteling Auxiliary Engines >5,000 TEU ship size	Point	2 [a]	146	—	—	1,476	590	1.77

Table E2.3-2. AERMOD Source Release Parameters – Operational Emissions

Source Type	Source Description	AERMOD Source Type	No. of Sources	Release Height (feet)	Source Width (m)	Line Source Spacing (m)	Exit Velocity (fpm)	Exit Temp. (°F)	Stack Diam. (feet)
Ships (continued)	Hoteling Boilers – all ship sizes	Point	2 [a]	131	—	—	3,590	547	1.62
Tugboats	Harbor Transit	Volume	33	50	100	200	—	—	—
	Turning	Volume	1	50	300	600	—	—	—
	Docking	Volume	1	50	300	600	—	—	—
Terminal Equipment	Terminal Equipment at Berth 97-109	Volume	86 [e]	15	Various [d]	—	—	—	—
	Berth 121-131 Rail Yard Equipment	Volume	16	15	50	—	—	—	—
Locomotives	Berth 121-131 Rail Yard Locomotives	Volume	16	Various [b]	50	—	—	—	—
	Trains Departing/ Arriving Berth 121-131 Rail Yard	Volume	142	Various [c]	15	30	—	—	—
Trucks	Trucks Queuing at Berth 121-131 In-Gate	Volume	1	15	100	—	—	—	—
	Trucks driving from In-Gate to B97-109 Terminal	Volume	3	15	75	—	—	—	—
	Trucks on B97-109 Terminal	Volume	86 [e]	15	Various [d]	—	—	—	—
	Knoll entry road from Front Street to Berth 121-131 in-gate	Volume	39	15	22	44	—	—	—
	SR-47 from I-110 to the Vincent Thomas Bridge	Volume	17	15	22	44	—	—	—
	I-110 from SR-47 to Anaheim Street	Volume	62	15	39	78	—	—	—
	Harbor Boulevard from Swinford Avenue to Front Street	Volume	9	15	24	48	—	—	—
	Front Street from Harbor Boulevard to John S. Gibson Boulevard	Volume	27	15	24	48	—	—	—
	J.S. Gibson Boulevard from Front Street to Harry Bridges Boulevard	Volume	41	15	24	48	—	—	—

Table E2.3-2. AERMOD Source Release Parameters – Operational Emissions

Source Type	Source Description	AERMOD Source Type	No. of Sources	Release Height (feet)	Source Width (m)	Line Source Spacing (m)	Exit Velocity (fpm)	Exit Temp. (°F)	Stack Diam. (feet)
Trucks (continued)	Figueroa Street from C Street to Harry Bridges Boulevard	Volume	5	15	24	48	—	—	—
	C Street from I-110 to Figueroa Street	Volume	4	15	24	48	—	—	—
	Harry Bridges Boulevard from J.S. Gibson to Alameda Street	Volume	43	15	21	42	—	—	—
	Alameda Street from Harry Bridges Boulevard to Anaheim Street	Volume	43	15	21	42	—	—	—
	SR-47 eastbound on-ramp at Harbor Boulevard	Volume	17	15	13	26	—	—	—
	SR-47 westbound on-ramp at Harbor Boulevard	Volume	17	15	13	26	—	—	—
	I-110 northbound on-ramp at J.S. Gibson Boulevard	Volume	14	15	13	26	—	—	—

[a] One source represents Berth 100 and the other represents Berth 102.

[b] The volume source height for locomotives at the on-dock rail yard was 21.8 feet and 44.5 feet for daytime and nighttime conditions, respectively. These heights were derived from the *Roseville Railyard Study* (CARB, 2004).

[c] The volume source height for locomotives in transit was 18.3 feet and 47.7 feet for daytime and nighttime conditions, respectively. These heights were derived from the *Roseville Railyard Study* (CARB, 2004).

[d] Volume sources covering the Berth 97-109 Terminal area range in width from 50 to 250 meters.

[e] The full Berth 97-109 terminal area for the proposed Project is represented by 86 volume sources. Fewer than 86 sources are used to represent the terminal area for the CEQA baseline, NEPA baseline, and various project alternatives.

[g] Based on a series of visual observations of containership exhaust plumes at the POLA, the plume height was conservatively assumed to be 25% above stack height for fairway and precautionary area transit, 50% above stack height for harbor transit, and 100% above stack height for turning and docking. The lower apparent wind speeds at slower ship speeds result in a higher plume rise.

fpm feet per minute
m meter
°F degrees Fahrenheit

E2.3.2 Meteorological Data

Due to the blocking effect of the Palos Verdes Hills, wide variations in wind conditions often occur within the POLA. For example, during typical sea-breeze conditions, the hills can create a relatively light wind zone in the Inner Harbor while the Outer Harbor experiences stronger winds in a different direction. The monthly and hourly streamlines developed for the South Coast Air Basin in *California South Coast Air Basin Hourly Wind Flow Patterns* show a clear difference in wind speed and direction between the inner and outer harbor regions (SCAQMD, 1977).

POLA currently is operating a monitoring program that includes the collection of meteorological data from several locations within port boundaries (Port, 2004). Recently, meteorological data sets containing a full year of consecutive hourly observations, from July 1, 2005, through June 30, 2006, became available. The data sets contain 8,760 hourly observations of wind speed, wind direction, temperature, atmospheric stability, and mixing height recorded at each of the monitoring stations in the network.

The two most representative meteorological data sets selected for this analysis were collected at Saints Peter and Paul Elementary School (SPPS) in Wilmington, about 2 miles north of the project site, and at Berth 47 (B47), about 2.5 miles south of the project site. The SPPS station is representative of inner harbor wind patterns, while the B47 station is representative of outer harbor wind patterns.

To account for the unique wind patterns in the project area, the modeling domain for this analysis was split into inner and outer harbor regions. The division between the inner harbor (to the north) and the outer harbor (to the south) is roughly a line extending east and west of the 22nd Street landing at the port. Emission sources located in the inner harbor region, which includes construction sources and most operational sources, were modeled with the SPPS meteorological data. Emission sources located in the outer harbor region, which includes ships and tugboats, were modeled with the B47 meteorological data. The modeling results were then summed at each common receptor point.

The meteorological data was processed using the USEPA's approved AERMET (version 04300) meteorological data preprocessor for the AERMOD dispersion model. AERMET uses three steps to preprocess and combine the surface and upper-air soundings to output the data in a format which is compatible with the AERMOD model. The first step extracts the data and performs a brief quality assurance check of the data. The second step merges the meteorological data sets. And the third step outputs the data in the AERMOD compatible format while also incorporating surface characteristics surrounding the collection or application site.

The output from the AERMET model consists of two separate files: the surface conditions file and a vertical profile dataset. AERMOD utilizes these two files in the dispersion modeling algorithm to predict pollutant concentrations resulting from a source's emissions.

E2.3.3 Model Options

Technical options selected for the AERMOD model used regulatory default. Use of these options follows the USEPA modeling guidance (40 CFR, Appendix W; April 15, 2003).

The following temporal distribution of emissions was modeled for annual average concentrations:

Ships in transit, Tugboats	80% of emissions 4 am – 8 pm 20% of emissions 8 pm – 4 am
Terminal Equipment, Railyard Equipment, Onsite Trucks	80% of emissions 8 am – 5 pm 15% of emissions 5 pm – 3 am 5% of emissions 3 am – 8 am
Offsite Trucks	80% of emissions 6 am – 6 pm 20% of emissions 6 pm – 6 am
Locomotives, Hoteling Ships	Uniform distribution of emissions 24 hr/day

These emission distributions are based on data published by CARB in the *Diesel Particulate Matter Exposure Assessment Study for the Ports of Los Angeles and Long Beach* (April 2006).

The following temporal distribution of emissions was modeled for peak 1-hour, 8-hour, and 24-hour concentrations:

Ships in transit, Tugboats, Hoteling Ships, Railyard Equipment, Locomotives	Uniform distribution of emissions 24 hr/day
Terminal Equipment, Onsite Trucks	80% of emissions 8 am – 5 pm 15% of emissions 5 pm – 3 am 5% of emissions 3 am – 8 am
Offsite Trucks	80% of emissions 6 am – 6 pm 20% of emissions 6 pm – 6 am

E2.3.4 Receptor Locations Used in the AERMOD

Receptor and source base elevations were determined from USGS Digital Elevation Model (DEM) data using the 7.5-minute format (i.e., 30-meter spacing between grid nodes). All coordinates were referenced to UTM North American Datum 1927 (NAD27), zone 11.

Cartesian coordinate receptor grids were used to provide adequate spatial coverage surrounding the project area to assess ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum-impact locations. For construction emission modeling, a 50-meter spacing receptor grid extended outwards to 2,000 meters (m) from the terminal boundary, and a coarse grid of 100-m spacing extended from 2,000 m to 5 kilometers (km) from the terminal boundary. In addition, property line receptors were spaced at 50-meter intervals. Property line receptors bordering water and grid receptors on water were not included in the dispersion analysis (SCAQMD, 2005b).

For operation emission modeling, a 250-m coarse grid was used which extended 5 kilometers from the terminal. In addition, property line receptors were spaced at 50-meter intervals. Fine grid receptors with 50-m spacing were placed over locations of maximum concentrations. Receptors on water and property line receptors bordering water were not included in the dispersion analysis.

AERMAP, version 06341, was used to calculate source elevations, receptor elevations and the controlling hill height for each receptor.

E2.4 Significance Criteria for Project Air Quality Impacts

The SCAQMD has established thresholds to determine the significance of ambient air quality impacts from proposed land use development projects (SCAQMD, 2006). The criteria for project construction and operation are listed in Tables E2.4-1 and E2.4-2, respectively.

Table E2.4-1. SCAQMD Thresholds for Ambient Air Quality Concentrations Associated with Project Construction

Air Pollutant	Ambient Concentration Threshold
Nitrogen Dioxide (NO_2) [a]	0.18 ppm (338 $\mu g/m^3$)
1-hour average	
Particulates (PM_{10}) [b]	
24-hour average	10.4 $\mu g/m^3$
Particulates ($PM_{2.5}$)	
24-hour average	10.4 $\mu g/m^3$
Carbon Monoxide (CO) [a]	
1-hour average	20 ppm (23,000 $\mu g/m^3$)
8-hour average	9.0 ppm (10,000 $\mu g/m^3$)

Notes:

a. The NO_2 and CO thresholds are absolute thresholds; the maximum predicted impact from proposed project operations is added to the background concentration for the Project vicinity and compared to the threshold.

b. The PM_{10} and $PM_{2.5}$ thresholds are incremental thresholds. The maximum predicted impact from construction activities (without adding the background concentration) is compared to the threshold.

c. The SCAQMD has also established thresholds for sulfates and annual PM_{10}, but is currently not requiring a quantitative comparison to these thresholds (SCAQMD, 2005b).

d. To evaluate Project impacts to ambient NO_2 levels, the analysis replaced the use of the current SCAQMD NO_2 thresholds with the revised 1-hour California ambient air quality standard of 338 $\mu g/m^3$.

$\mu g/m^3$ micrograms per cubic meter

Source: SCAQMD, 2006.

Table E2.4-2. SCAQMD Thresholds for Ambient Air Quality Concentrations Associated with Project Operation

Air Pollutant	Ambient Concentration Threshold
Nitrogen Dioxide (NO_2) [a]	
1-hour average [d]	0.18 ppm (338 $\mu g/m^3$)
annual average [d]	0.033 ppm (56 $\mu g/m^3$)
Particulates (PM_{10}) [b]	
24-hour average	2.5 $\mu g/m^3$
Particulates ($PM_{2.5}$)	
24-hour average	2.5 $\mu g/m^3$
Carbon Monoxide (CO) [a]	
1-hour average	20 ppm (23,000 $\mu g/m^3$)
8-hour average	9.0 ppm (10,000 $\mu g/m^3$)

Notes:

a. The NO_2 and CO thresholds are absolute thresholds; the maximum predicted impact from proposed project operations is added to the background concentration for the Project vicinity and compared to the threshold.

b. The PM_{10} and $PM_{2.5}$ thresholds are incremental thresholds. For CEQA significance, the maximum increase in concentration relative to the 2003 baseline (i.e., Project impact minus baseline impact) is compared to each threshold. For NEPA significance, the maximum increase in concentration relative to NEPA (i.e., Project impact minus NEPA baseline impact) is compared to the threshold.

c. The SCAQMD has also established thresholds for sulfates and annual PM_{10}, but is currently not requiring a quantitative comparison to these thresholds (SCAQMD, 2005b).

d. To evaluate Project impacts to ambient NO_2 levels, the analysis replaced the use of the current SCAQMD NO_2 thresholds with the revised 1-hour and annual California ambient air quality standard of 338 $\mu g/m^3$.

$\mu g/m^3$ micrograms per cubic meter

Source: SCAQMD, 2006.

In this analysis, annual NO_2 concentrations were estimated from the AERMOD-predicted NO_X concentrations according to the SCAQMD localized significance threshold methodology (SCAQMD, 2003). For construction emissions, NO_2 and CO ground-level concentrations that were predicted by AERMOD for each construction phase were added to the background concentrations of each pollutant, and the total concentrations were compared to the SCAQMD thresholds. The particulate matter concentrations predicted by AERMOD (without adding the background concentration) were compared directly to the SCAQMD incremental PM_{10} and $PM_{2.5}$ thresholds.

For operational emissions, NO_2 and CO ground-level concentrations that were predicted by AERMOD for each project alternative were added to the background concentrations of each pollutant, and the total concentrations were compared to the SCAQMD thresholds. To assess the significance of operational PM_{10} and $PM_{2.5}$ impacts under CEQA, the incremental increase in PM_{10} and $PM_{2.5}$ concentrations relative to CEQA baseline concentrations were determined. Under the National Environmental Policy Act (NEPA), the incremental increase in PM_{10} concentrations relative to the NEPA baseline concentrations was determined. Both PM_{10} incremental concentration increases (Proposed Project minus CEQA baseline, and proposed Project minus NEPA baseline) were compared to the SCAQMD incremental PM_{10} thresholds.

E2.5 Predicted Air Quality Impacts

E2.5.1 Construction Impacts

Construction impacts were evaluated for Phase I with mitigation, and for Phases II and III both with and without mitigation. Annual concentrations were not modeled for NO_2, PM_{10}, or $PM_{2.5}$ based on direction from SCAQMD (SCAQMD, 2005b).

According to the SCAQMD localized significance threshold methodology (SCAQMD, 2003), the conversion rates of NO_X to NO_2 were estimated based on the distance from the center of the source to the impact concentration's location. NO_2 concentrations were calculated assuming a 75 percent conversion rate from NO_X to NO_2. This conversion rate assumes the locations of the receptors with the maximum impacts are within 2,000 meters of the emission sources that contribute the majority of the modeled concentrations. This assumption is conservative because most of the sources are located closer than 1,500 meters from the maximum impacted location, and thus would have a lower conversion rate.

E2.5.1.1 Phase I

Table E2.5-1 summarizes the AERMOD modeling results of mitigated Phase I emissions. Unmitigated Phase I concentrations were not modeled because Phase I has already been completed and mitigation (emulsified fuel in derrick barges) was implemented. The NO_2 and CO concentrations due to Phase I construction were added to the maximum background concentrations monitored at North Long Beach Station during the last 3 years (2004 through 2006). The total ground-level concentrations were compared with the SCAQMD thresholds. The AERMOD modeling results for PM_{10} and $PM_{2.5}$, which represent the incremental increases relative to the CEQA and NEPA baselines (which are assumed to be zero for construction impacts), were compared directly to the PM_{10} and $PM_{2.5}$ thresholds without adding a background concentration.

Locations of the maximum NO_2 and CO concentrations, as well as the locations of the maximum PM_{10} and $PM_{2.5}$ increments, for Phase I are shown in Figure E2.5-1.

Table E2.5-1 shows that the maximum 1-hour NO_2 concentration of 381 micrograms per cubic meter ($\mu g/m^3$) exceeds the SCAQMD threshold for construction. Both 1-hour and 8-hour CO concentrations are below the SCAQMD thresholds.

The maximum 24-hour PM_{10} and $PM_{2.5}$ concentration increments due to Phase I construction are 12.0 $\mu g/m^3$ and 3.2 $\mu g/m^3$ respectively. The PM_{10} concentration increment exceeds the SCAQMD-recommended PM_{10} significance threshold of 10.4 $\mu g/m^3$ for construction. The $PM_{2.5}$ increment concentration is below the SCAQMD significance threshold of 10.4 $\mu g/m^3$.

Table E2.5-1. Maximum NO_2, CO, PM_{10} and $PM_{2.5}$ Impacts – Phase I Construction with Mitigation

Pollutant	Averaging Time	Maximum Concentration of Phase I (without background) ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Ground-Level Concentration ($\mu g/m^3$)	SCAQMD Threshold ($\mu g/m^3$)
NO_2	1-hour	117.7	263	**381**	338
CO	1-hour	62.91	4,809	4,872	23,000
	8-hour	14.15	4,008	4,022	10,000
PM_{10}	24-hour	**12.02**	—	—	10.4
$PM_{2.5}$	24-hour	3.16	—	—	10.4

Notes:

[a] Exceedances of the thresholds are indicated in **bold**.

[b] Phase I concentrations were not modeled without mitigation because mitigation was implemented during Phase I.

[c] Construction schedules are assumed to be 10 hours per day for all construction equipments and vehicles. Ships hoteling are assumed to be 24 hours per day.

[d] In accordance with SCAQMD guidance, ship transit emissions, tugboat emissions, and offsite haul-truck transport emissions are considered offsite emissions and were not included in the modeling (SCAQMD, 2005a). However, ship hoteling and onsite truck emissions are considered onsite emissions and, therefore, were included in the modeling.

[e] The threshold for PM_{10} and $PM_{2.5}$ are incremental threshold; therefore, the concentration without background is compared to the threshold.

[f] The background concentrations represent the maximum concentrations monitored at the Long Beach Monitoring Station during 2004 through 2006.

[g] NO_2 concentrations were calculated assuming NO_X to NO_2 conversion rate of 75 percent (SCAQMD, 2003). This conversion rate assumes the maximum impact locations occur within 2,000 meters of the emission sources that contribute the most to the modeled concentrations. This is a conservative approach, as the majority of emission sources that contribute to the maximum NO_2 impact location are within 1,500 meters and the SCAQMD NO_X to NO_2 conversion factor would be lower.

$\mu g/m^3$ micrograms per cubic meter

E2.5.1.2 Phase II and Phase III Without Mitigation

Table E2.5-2 summarizes the AERMOD modeling results of unmitigated Phases II and III emissions. The emissions used in the modeling were the worst-case emissions of Phases II and Phase III, accounting for any overlap in activities among the two phases and within each phase.

The NO_2 and CO concentrations due to construction of Phases II and III were added to the background concentrations and compared to the SCAQMD thresholds. The AERMOD modeling result for PM_{10} and $PM_{2.5}$ represent the incremental increase due to the project and was compared directly to the SCAQMD thresholds without adding a background concentration.

Locations of the maximum NO_2 and CO concentrations, as well as the locations of the maximum PM_{10} and $PM_{2.5}$ increment for Phases II and III of the proposed Project are shown in Figure E2.5-2.

Table E2.5-2 shows that the maximum 1-hour NO_2 concentration associated with Phase II/III construction is 353 $\mu g/m^3$, which exceeds the SCAQMD threshold of 338 $\mu g/m^3$.

Table E2.5-2. Maximum NO_2, CO, PM_{10} and $PM_{2.5}$ Impacts – Phases II and III Construction Without Mitigation

Pollutant	Averaging Time	Maximum Concentration of Unmitigated Phases II and III (without background) ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Ground-Level Concentration ($\mu g/m^3$)	SCAQMD Threshold ($\mu g/m^3$)
NO_2	1-hour	89.5	263	**353**	338
CO	1-hour	40.51	4,809	4,850	23,000
	8-hour	9.08	4,008	4,017	10,000
PM_{10}	24-hour	4.37	—	—	10.4
$PM_{2.5}$	24-hour	1.28	—	—	10.4

Notes:

[a] Exceedances of the thresholds are indicated in **bold**.

[b] Because Phases II and III have overlapping construction schedules, the modeling results for Phases II and III are based on the maximum combined emissions from these two phases for those construction activities with overlapping schedules.

[c] The construction schedule is assumed to be 10 hours per day, for all construction equipments and vehicles. Ships hoteling are assumed to be 24 hours per day.

[d] In accordance with SCAQMD guidance, ship transit emissions, tugboat emissions, and offsite haul truck transport emissions are considered offsite emissions and were not included in the modeling (SCAQMD, 2005a). However, ship hoteling and onsite truck emissions are considered onsite emissions and therefore were included in the modeling.

[e] The threshold for PM_{10} and $PM_{2.5}$ are incremental threshold; therefore, the concentration without background is compared to the threshold.

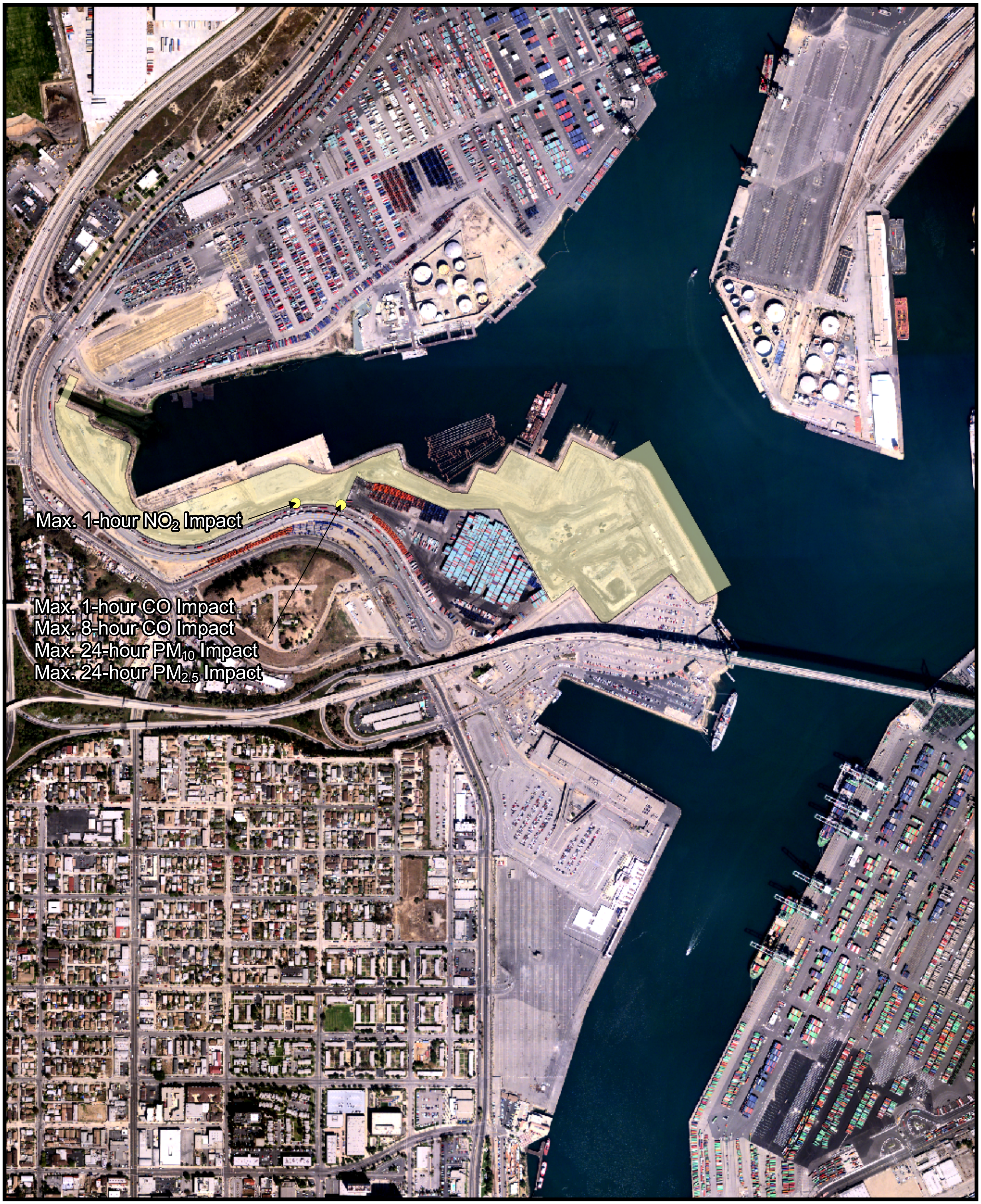
[f] The background concentrations represent the maximum concentrations monitored at the Long Beach Monitoring Station during 2004 through 2006.

[g] NO_2 concentrations were calculated assuming NO_X to NO_2 conversion rate of 75 percent (SCAQMD, 2003). This conversion rate assumes the maximum impact locations occur within 2,000 meters of the emission sources that contribute the most to the modeled concentrations. This is a conservative approach, as the majority of emission sources that contribute to the maximum NO_2 impact location are within 1,500 meters and the SCAQMD NO_X to NO_2 conversion factor would be lower.

$\mu g/m^3$ micrograms per cubic meter

Both 1-hour and 8-hour CO concentrations are below the SCAQMD thresholds.

The maximum 24-hour PM_{10} increment due to Phase II/III construction is 4.37 $\mu g/m^3$ and the maximum $PM_{2.5}$ increment is 1.28 $\mu g/m^3$, both are below the SCAQMD PM_{10} and $PM_{2.5}$ increment thresholds of 10.4 $\mu g/m^3$ for construction.



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Legend

- Maximum Impact Location
- Phase I Construction Area

N

0 — 0.25 Miles

0 — 0.25 Kilometers

1:12,000

Figure 5-1
Maximum Air Quality Impact Locations - Phase I Construction (with mitigation)

DRAFT

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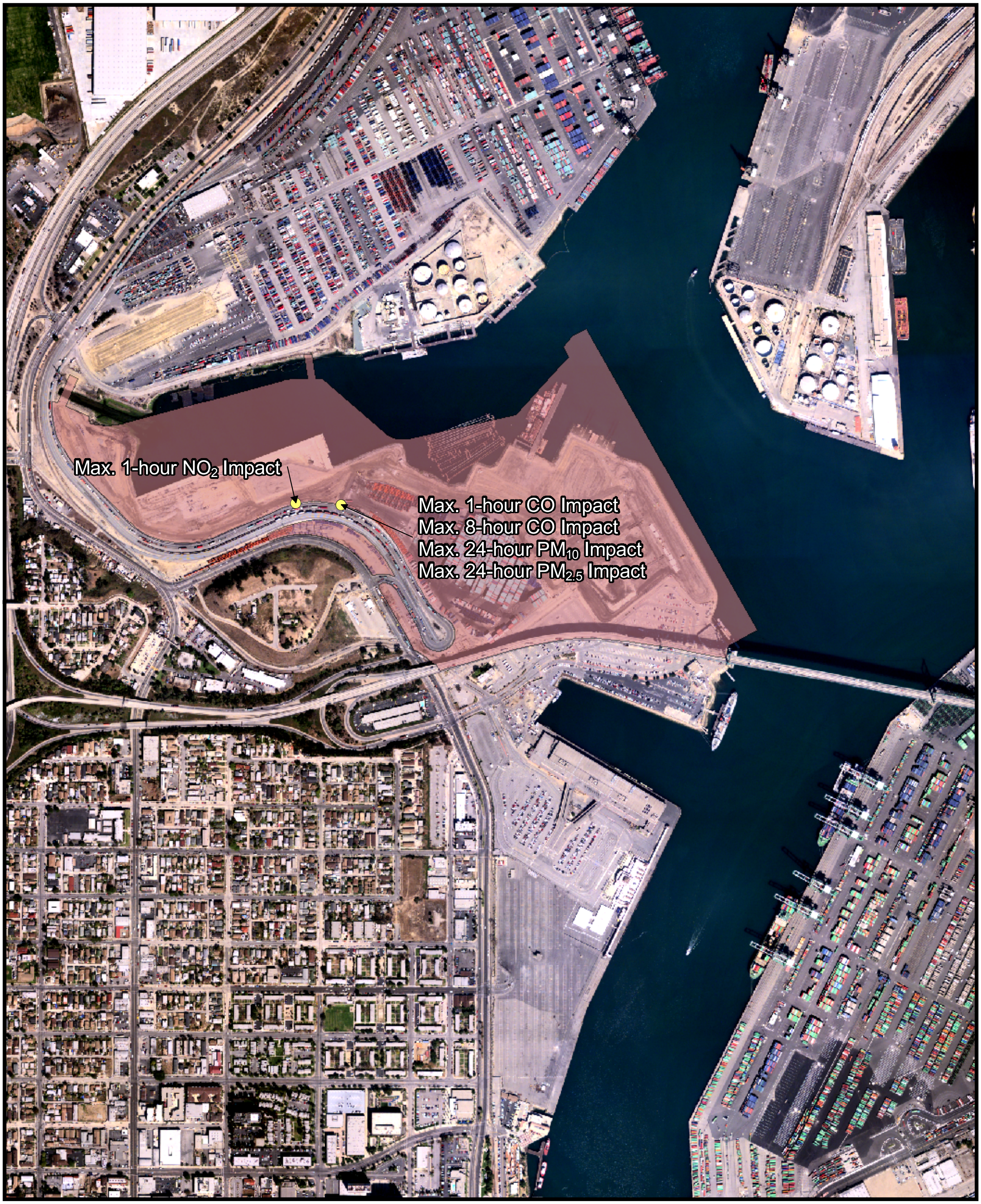
Figure5_1.pdf



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Legend

- Maximum Impact Location
- Phase II and Phase III Construction Area

N

0 — 0.25 Miles

0 — 0.25 Kilometers

1:12,000

Figure 5-2
Maximum Air Quality Impact Locations - Phase II and III Construction of Proposed Project without Mitigation

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E2.5.1.3 Mitigated Phases II and III

Table E2.5-3 summarizes the AERMOD modeling results for mitigated Phase II/III construction. The mitigation measures for construction are discussed in Section 3.2.4.3 of the EIS/EIR. The same methodologies used for unmitigated Phases II and III were used to determine the worst-case emissions and the air quality impacts for mitigated Phases II and III.

The locations of the maximum NO_2 and CO concentrations, as well as the PM_{10} and $PM_{2.5}$ increments for Phase II/III construction for the Mitigated Project are shown in Figure E2.5-3.

Table E2.5-3. Maximum NO_2, CO, PM_{10} and $PM_{2.5}$ Impacts – Phases II and III Construction with Mitigation

Pollutant	Averaging Time	Maximum Concentration of Phases II and III combined (without background) ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Ground-Level Concentration ($\mu g/m^3$)	SCAQMD Threshold ($\mu g/m^3$)
NO_2	1-hour	70.5	263	333	338
CO	1-hour	39.11	4,809	4,848	23,000
	8-hour	8.76	4,008	4,017	10,000
PM_{10}	24-hour	1.75	-		10.4
$PM_{2.5}$	24-hour	0.79	-		10.4

Notes:

[a] Because Phases II and III have overlapping construction schedules, the modeling results for Phases II and III are based on the maximum combined emissions from these two phases for those construction activities with overlapping schedules.

[b] The construction schedule is assumed to be 10 hours per day, for all construction equipments and vehicles. Ships hoteling are assumed to be 24 hours per day.

[c] In accordance with SCAQMD guidance, ship transit emissions, tugboat emissions, and offsite haul-truck transport emissions are considered offsite emissions and were not included in the modeling (SCAQMD, 2005a). However, ship hoteling and onsite truck emissions are considered onsite emissions and, therefore, were included in the modeling.

[d] The threshold for PM_{10} and $PM_{2.5}$ are incremental threshold; therefore, the concentration without background is compared to the threshold.

[f] The background concentrations represent the maximum concentrations monitored at the Long Beach Monitoring Station during 2004 through 2006.

[g] NO_2 concentrations were calculated assuming NO_X to NO_2 conversion rate of 75 percent (SCAQMD, 2003). This conversion rate assumes the maximum impact locations occur within 2,000 meters of the emission sources that contribute the most to the modeled concentrations. This is a conservative approach, as the majority of emission sources that contribute to the maximum NO_2 impact are within 1,500 meters of this location and the SCAQMD NO_X to NO_2 conversion factor for this distance would be lower.

The results shown in Table E2.5-3 indicate that, with mitigation measures, Phases II and III of project construction would have a maximum 1-hour NO_2 concentration of 333 $\mu g/m^3$ and the predicted impact would be below the SCAQMD threshold.

Both 1-hour and 8-hour CO concentrations are below the SCAQMD thresholds.

The 24-hour PM_{10} increment of 1.75 μg/m^3 is below the SCAQMD increment threshold of 10.4 μg/m^3 for construction. The 24-hour $PM_{2.5}$ increment of 0.79 μg/m^3 is below the SCAQMD increment threshold of 10.4 μg/m^3 for construction.

E2.5.2 Operational Impacts

E2.5.2.1 CEQA and NEPA Baselines

Table E2.5-4 summarizes the maximum modeled concentrations of NO_2, CO, PM_{10}, and $PM_{2.5}$ for the CEQA baseline and NEPA baseline scenarios during operations. Locations of these maximum concentrations are shown in Figures E2.5-4 and E2.5-5.

The CEQA baseline and NEPA baseline concentrations serve as the baseline levels against which the PM_{10} and $PM_{2.5}$ incremental concentrations are determined for the proposed Project, Mitigated Project, and other project alternatives. The PM_{10} and $PM_{2.5}$ increment relative to CEQA baseline concentrations is used to determine impacts under CEQA, and the PM_{10} increment relative to NEPA baseline concentrations is used to determine impacts under NEPA.

Table E2.5-4. CEQA Baseline and NEPA Baseline Ground-Level Concentrations during Operation

Pollutant	Averaging Time	Maximum Modeled Concentration of CEQA Baseline (μg/m^3)	Maximum Modeled Concentration of NEPA Baseline [b] (μg/m^3)	Background Concentration [a] (μg/m^3)	Total Ground-Level Concentration – CEQA Baseline (μg/m^3)	Total Ground-Level Concentration – NEPA Baseline (μg/m^3)
NO_2	1-hour	785	961	263	1,048	1,224
	Annual	28	33	52.7	80	85
CO	1-hour	417	5,976	4,809	5,226	10,785
	8-hour	107	1,495	4,008	4,115	5,503
PM_{10}	24-hour	10.2	5.7	—	—	—
$PM_{2.5}$	24-hour	9.4	3.8	—	—	—

[a] The background concentrations were obtained from the North Long Beach Monitoring Station. The maximum data during 2004, 2005, and 2006 were used.

[b] For the NEPA baseline, Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

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Legend

Maximum Impact Location

Phase II and Phase III Construction Area

N

0 0.25 Miles

0 0.25 Kilometers

1:15,000

Figure 5-3
Maximum Air Quality Impact Locations - Phase II and III Construction of Proposed Project with Mitigation

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Legend

Maximum Impact Location

CEQA Baseline Terminal Area

N

0 0.25 Miles

0 0.25 Kilometers

1:12,000

Figure 5-4
Maximum Concentration Locations of CEQA Baseline Operation

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Legend

- Maximum Impact Location
- NEPA Baseline Terminal Area

N

0 — 0.25 Miles

0 — 0.25 Kilometers

1:12,000

Figure 5-5
Maximum Concentration Locations of NEPA Baseline Operation

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E2.5.2.2 Proposed Project

Table E2.5-5 presents a summary of the maximum ground-level concentrations of NO_2 and CO due to operational emissions of the proposed Project. NO_2 and CO concentrations were added to the maximum background concentrations monitored at North Long Beach Station during the years 2004 to 2006. The total ground-level concentrations were compared with SCAQMD thresholds.

Modeling results of maximum PM_{10} and $PM_{2.5}$ concentrations for the proposed Project, CEQA baseline, and NEPA baseline scenarios, as well as the CEQA increment (Project minus CEQA baseline) and NEPA increment (Project minus NEPA baseline) are shown in Table E2.5-6. Worst-case increments of PM_{10} and $PM_{2.5}$ concentrations were obtained by subtracting the concentrations due to CEQA baseline or NEPA baseline from the concentrations due to proposed Project at each common receptor, and then selecting the receptor with the highest difference. The maximum increments among all receptors were compared to the SCAQMD thresholds. The example provided in the discussion of Impact AQ-7 for the proposed Project in Section 3.2 of the EIS/EIR further illustrates how the increments are calculated.

The results in Tables E2.5-5 and 5-6 represent the maximum impacts predicted for the proposed project at the maximum impacted receptor locations. The impacts at all other receptors would be less than these values.

The receptor locations of maximum NO_2 and CO concentrations and the PM_{10} and $PM_{2.5}$ increments for the proposed Project are shown in Figure E2.5-6. The locations of maximum incremental increases of PM_{10} and $PM_{2.5}$ concentrations are not necessarily at the same locations as the maximum concentrations due to the proposed Project, CEQA baseline, or NEPA baseline alone.

Table E2.5-5. Maximum NO_2 and CO Impacts – Proposed Project Operation

Pollutant	Averaging Time	Maximum Modeled Concentration of Proposed Project ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Ground-Level Concentration ($\mu g/m^3$)	SCAQMD Threshold ($\mu g/m^3$)
NO_2	1-hour	1,780	263	**2,043**	338
	Annual	55	52.7	**108**	56
CO	1-hour	1,833	4,809	6,642	23,000
	8-hour	456	4,008	4,464	10,000

Notes:

[a] Exceedances of the thresholds are indicated in bold.

[b] The background concentrations were obtained from the North Long Beach Monitoring Station. The maximum data during 2004, 2005, and 2006 were used.

[c] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-6. Maximum PM_{10} and $PM_{2.5}$ Impacts – Proposed Project Operations

	Maximum Modeled Concentration of Proposed Project [e] (μg/m^3)	Maximum Modeled Concentration of CEQA Baseline (μg/m^3)	Maximum Modeled Concentration of NEPA Baseline (μg/m^3)	CEQA Increment (μg/m^3)	NEPA Increment (μg/m^3)	SCAQMD Threshold (μg/m^3)
PM_{10} 24-hour	15.6	10.2	5.7	**10.0**	**10.0**	2.5
$PM_{2.5}$ 24-hour	12.9	9.4	3.8	**8.0**	**9.1**	2.5

Notes:

[a] Exceedances of the thresholds are indicated in bold.

[b] The maximum concentrations and increments presented in this table do not necessarily occur at the same receptor location. This means that the increments cannot necessarily be determined by simply subtracting the baseline concentrations from the project concentration. The example provided in the discussion of Impact AQ-7 for the proposed Project in Section 3.2 of the EIS/EIR illustrates how the increments are calculated.

[c] The CEQA increment represents Project minus CEQA baseline. The NEPA increment represents Project minus NEPA baseline.

[d] Data represent the receptor locations with the maximum impacts or increments. The impacts or increments at all other receptors would be less than these values.

[e] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

The data in Tables E2.5-5 and E2.5-6 show that the maximum 1-hour and annual concentrations of NO_2 associated with proposed Project operations are 2,043 and 108 μg/m^3, respectively. The 1-hour and annual concentrations exceed the SCAQMD significance thresholds.

The maximum 1-hour and 8-hour CO concentrations due to the proposed Project are well below the SCAQMD significance thresholds.

The CEQA and NEPA 24-hour PM_{10} increments associated with proposed Project operations are predicted to be 10.0 and 10.0 μg/m^3, respectively. The CEQA and NEPA 24-hour $PM_{2.5}$ increments associated with proposed Project operations are predicted to be 8.0 and 9.1 μg/m^3, respectively The increments exceed the SCAQMD 24-hour PM_{10} and $PM_{2.5}$ thresholds of 2.5 μg/m^3 for project operations.

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Legend

- Maximum Impact Location
- Proposed Project Terminal Area

N

0 — 0.25 Miles

0 — 0.25 Kilometers

1:12,000

Figure 5-6
Maximum Air Quality Impact Locations - Proposed Project Operation

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Figure5_6.pdf

E2.5.2.3 Mitigated Project

Tables E2.5-7 and E2.5-8 present a summary of the maximum ground-level concentrations of NO_2 and CO, and the PM_{10} and $PM_{2.5}$ concentration increments due to the Mitigated Project operations. The mitigation measures for project operations are discussed in Section 3.2.4.3 of the EIS/EIR. The NO_2 and CO concentrations, as well as the CEQA and NEPA PM_{10} and $PM_{2.5}$ concentration increments, were evaluated using the same methodologies that were used for the proposed Project.

Locations of the maximum NO_2 and CO concentrations and the PM_{10} and $PM_{2.5}$ increments for the Mitigated Project are shown in Figure E2.5-7.

Table E2.5-7. Maximum NO_2 and CO Impacts – Mitigated Project Operations

Pollutant	Averaging Time	Maximum Modeled Concentration of Mitigated Project (µg/m³)	Background Concentration (µg/m³)	Total Ground-Level Concentration (µg/m³)	SCAQMD Threshold (µg/m³)
NO_2	1-hour	1,919	263	**2,182**	338
	Annual	47.9	52.7	**101**	56
CO	1-hour	10,613	4,809	15,422	23,000
	8-hour	2,620	4,008	6,628	10,000

Notes:
[a] Exceedances of the thresholds are indicated in bold.
[b] The background concentrations were obtained from the North Long Beach Monitoring Station. The maximum data during 2004, 2005, and 2006 were used.
[c] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-8. Maximum PM_{10} and $PM_{2.5}$ Impacts – Mitigated Project Operations

	Maximum Modeled Concentration of Mitigated Project (µg/m³)	Maximum Modeled Concentration of CEQA Baseline (µg/m³)	Maximum Modeled Concentration of NEPA Baseline (µg/m³)	CEQA Increment (µg/m³)	NEPA Increment (µg/m³)	SCAQMD Threshold (µg/m³)
PM_{10} 24-hour	10.1	10.2	5.7	**6.5**	**6.2**	2.5
$PM_{2.5}$ 24-hour	7.8	9.4	3.8	**5.2**	**5.3**	2.5

Notes:
[a] Exceedances of the thresholds are indicated in **bold**.
[b] The maximum concentrations and increments presented in this table do not necessarily occur at the same receptor location. This means that the increments cannot necessarily be determined by simply subtracting the baseline concentrations from the project concentration. The example provided in the discussion of Impact AQ-7 for the proposed Project in Section 3.2 of the EIS/EIR illustrates how the increments are calculated.
[c] The CEQA increment represents Project minus CEQA baseline. The NEPA increment represents Project minus NEPA baseline.
[d] Data represent the receptor locations with the maximum impacts or increments. The impacts or increments at all other receptors would be less than these values.
[e] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

The data in Tables E2.5-7 and E2.5-8 show that the maximum 1-hour and annual concentrations of NO_2 associated with the proposed Project after mitigation are 2,182 and 101 $\mu g/m^3$, respectively. The 1-hour and annual NO_2 concentrations exceed the SCAQMD significance thresholds.

The maximum 1-hour and 8-hour CO concentrations are below the SCAQMD significance thresholds.

The maximum concentrations of NO_X and CO would be higher after mitigation than before mitigation because of the use of liquefied propane gas (LPG) as a mitigation measure for yard tractors, per Mitigation Measure AQ-15. This mitigation measure would result in higher emissions of NO_X and CO compared to diesel yard tractors between the years 2009 and 2014, thus resulting in increased NO_X and CO concentrations.

The CEQA and NEPA 24-hour PM_{10} increments associated with the proposed Project after mitigation are predicted to be 6.5 and 6.2 $\mu g/m^3$, respectively. The CEQA and NEPA 24-hour $PM_{2.5}$ increments associated with the proposed Project after mitigation are predicted to be 5.2 and 5.3 $\mu g/m^3$, respectively. These increments are less than the proposed Project increments due to the mitigation measures; however, the 24-hour CEQA and NEPA increments still exceed the significance thresholds of 2.5 $\mu g/m^3$.

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Legend

Maximum Impact Location

Proposed Project Terminal Area

N

0 0.25 Miles

0 0.25 Kilometers

1:18,000

Figure 5-7
Maximum Air Quality Impact Locations - Mitigated Project Operation

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E2.5.2.4 Alternative 1 (No Project)

Tables E2.5-9 and E2.5-10 present summaries of the maximum ground-level concentrations of NO_2, CO and of PM_{10} and $PM_{2.5}$ concentration increments due to the No Project alternative operations. The NO_2 and CO concentrations, as well as the CEQA and NEPA PM_{10} and $PM_{2.5}$ concentration increments, were evaluated using the same methodologies used for the proposed Project.

Locations of the maximum NO_2 and CO concentrations and the PM_{10} and $PM_{2.5}$ increments for the No Project are shown in Figure E2.5-8.

Table E2.5-9. Maximum NO_2 and CO Impacts – Alternative 1 (No Project) Operations

Pollutant	Averaging Time	Maximum Modeled Concentration of No Project (µg/m^3)	Background Concentration (µg/m^3)	Total Ground-Level Concentration (µg/m^3)	SCAQMD Threshold (µg/m^3)
NO_2	1-hour	868	263	**1,131**	338
	Annual	29.6	52.7	**82**	56
CO	1-hour	5,392	4,809	10,201	23,000
	8-hour	1,387	4,008	5,395	10,000

Note:
[a] Exceedances of the thresholds are indicated in bold.
[b] The background concentrations were obtained from the North Long Beach Monitoring Station. The maximum data during 2004, 2005, and 2006 were used.
[c] Phase II/III construction emissions associated with shoreside gantry crane removal were modeled with the operational emissions.

Table E2.5-10. Maximum PM_{10} and $PM_{2.5}$ Impacts – Alternative 1 (No Project) Operation

	Maximum Modeled Concentration of No Project (µg/m^3)	Maximum Modeled Concentration of CEQA Baseline (µg/m^3)	CEQA Increment (µg/m^3)	SCAQMD Threshold (µg/m^3)
PM_{10} 24-hour	3.7	10.2	1.5	2.5
$PM_{2.5}$ 24-hour	3.6	9.4	1.5	2.5

Notes:
[a] Exceedances of the thresholds are indicated in **bold**.
[b] The maximum concentrations and increments presented in this table do not necessarily occur at the same receptor location. This means that the increments cannot necessarily be determined by simply subtracting the baseline concentrations from the No Project concentration. The example provided in the discussion of Impact AQ-7 for the proposed Project in Section 3.2 of the EIS/EIR illustrates how the increments are calculated.
[c] The “CEQA increment” represents No Project minus CEQA baseline.
[d] Data represent the receptor locations with the maximum impacts or increments. The impacts or increments at all other receptors would be less than these values.
[e] Phase II/III construction emissions associated with shoreside gantry crane removal were modeled with the operational emissions.

The data in Tables E2.5-9 and E2.5-10 show that the maximum 1-hour concentration of NO_2 for the No Project alternative is 1,131 $\mu g/m^3$, which exceeds the SCAQMD threshold. The maximum annual NO_2 concentration of 82 $\mu g/m^3$ exceeds the annual NO_2 threshold.

The maximum 1-hour and 8-hour CO concentrations are below the SCAQMD significance thresholds.

The 24-hour PM_{10} CEQA increment associated with the No Project alternative is predicted to be 1.5 $\mu g/m^3$, which would not exceed the SCAQMD significance threshold. The CEQA 24-hour $PM_{2.5}$ increment associated with the No Project Alternative is predicted to be 1.5 $\mu g/m^3$. The modeled 24-hour CEQA $PM_{2.5}$ increment would not exceed the SCAQMD significance threshold.

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Legend

- Maximum Impact Location
- No Project Terminal Area

N

0 — 0.25 Miles

0 — 0.25 Kilometers

1:18,000

Figure 5-8
Maximum Air Quality Impact Locations - No Project Operation

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E2.5.2.5 Operational Impacts from Other Project Alternatives

Maximum offsite ground-level concentrations of criteria pollutants estimated for the operation of Project Alternatives 2 through 6 before and after mitigation are presented in Tables E2.5-11 though E2.5-28 in this Appendix. These data were developed by modeling the operation emissions from each alternative.

Because the main source of emissions for Alternative 7 would be automobile trips (primarily gasoline powered), much of the emissions from these sources would tend to be dispersed throughout the region rather than concentrated at the Project site. As a result, this alternative is not expected to cause a violation of the CO or NO_2 standards. However, based on the dispersion modeling results for offsite truck trips for the proposed Project, it is estimated that the offsite vehicle trips associated with Alternative 7 would generate ambient PM_{10} and $PM_{2.5}$ levels exceeding the significance threshold of 2.5 μg/m^3 at receptors near heavily traveled Project-affected roadways.

Table E2.5-11. Maximum Offsite NO_2 and CO Concentrations Associated with Operation of Alternative 2

Pollutant	Averaging Time	Maximum Modeled Concentration of Alternative 2 (μg/m^3)	Background Concentration (μg/m^3)	Total Ground-Level Concentration (μg/m^3)	SCAQMD Threshold (μg/m^3)
NO_2	1-hour	962	263	**1,225**	338
	Annual	32.8	52.7	**85.5**	56.4
CO	1-hour	5,976	4,809	10,785	23,000
	8-hour	1,495	4,008	5,503	10,000

Notes:

[a] Exceedances of the thresholds are indicated in bold.

[b] The background concentrations were obtained from the North Long Beach Monitoring Station. The maximum concentrations during 2004, 2005, and 2006 were used.

[c] NO_2 concentrations were calculated assuming a 75 percent conversion rate from NO_X to NO_2 (SCAQMD, 2003c). This conversion rate assumes that the maximum receptor locations are located within 2,000 meters of the emission sources that contribute the most to the modeled concentrations.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-12. Maximum Offsite PM Concentrations Associated with Operation of Alternative 2

	Maximum Modeled Concentration of Alternative 2 (µg/m^3)	Maximum Modeled Concentration of CEQA Baseline (µg/m^3)	Maximum Modeled Concentration of NEPA Baseline (µg/m^3)	Ground-Level Concentration CEQA Increment[c] (µg/m^3)	Ground-Level Concentration NEPA Increment[c] (µg/m^3)	SCAQMD Threshold (µg/m^3)
PM_{10} 24-hour	5.8	10.2	5.7	**2.7**	0.8	2.5
$PM_{2.5}$ 24-hour	3.9	9.4	3.8	1.4	0.7	2.5

Notes:

[a] Exceedances of the threshold are indicated in **bold**. The threshold for PM_{10} is an incremental threshold; therefore, the incremental concentration without background is compared to the threshold.

[b] The maximum concentrations and increments presented in this table might not occur at the same receptor location. This means that the increments cannot necessarily be determined by simply subtracting the baseline concentrations from the No Project concentration. The example provided in the discussion of Impact AQ-7 for the proposed Project illustrates how the increments are calculated.

[c] The CEQA increment represents Alternative 2 minus CEQA baseline. The NEPA increment represents Alternative 2 minus NEPA baseline.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-13. Maximum Offsite NO_2 and CO Concentrations Associated with Operation of Alternative 3 without Mitigation

Pollutant	Averaging Time	Maximum Modeled Concentration of Alternative 3 (µg/m^3)	Background Concentration (µg/m^3)	Total Ground-Level Concentration (µg/m^3)	SCAQMD Threshold (µg/m^3)
NO_2	1-hour	1,740	263	**2,003**	338
	Annual	51.1	52.7	**103.8**	56.4
CO	1-hour	966	4,809	5,775	23,000
	8-hour	240	4,008	4,248	10,000

Notes:

[a] Exceedances of the thresholds are indicated in bold.

[b] The background concentrations were obtained from the North Long Beach Monitoring Station. The maximum concentrations during 2004, 2005, and 2006 were used.

[c] NO_2 concentrations were calculated assuming a 75 percent conversion rate from NO_X to NO_2 (SCAQMD, 2003c). This conversion rate assumes that the maximum receptor locations are located within 2,000 meters of the emission sources that contribute the most to the modeled concentrations.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-14. Maximum Offsite PM Concentrations Associated with Operation of Alternative 3 without Mitigation

	Maximum Modeled Concentration of Alternative 3 (µg/m^3)	Maximum Modeled Concentration of CEQA Baseline (µg/m^3)	Maximum Modeled Concentration of NEPA Baseline (µg/m^3)	Ground-Level Concentration CEQA Increment[c] (µg/m^3)	Ground-Level Concentration NEPA Increment[c] (µg/m^3)	SCAQMD Threshold (µg/m^3)
PM_{10} 24-hour	13.5	10.2	5.7	**8.4**	**7.9**	2.5
$PM_{2.5}$ 24-hour	12.2	9.4	3.8	**7.6**	**8.5**	2.5

Notes:

[a] Exceedances of the threshold are indicated in **bold**. The threshold for PM_{10} is an incremental threshold; therefore, the incremental concentration without background is compared to the threshold.

[b] The maximum concentrations and increments presented in this table might not occur at the same receptor location. This means that the increments cannot necessarily be determined by simply subtracting the baseline concentrations from the No Project concentration. The example provided in the discussion of Impact AQ-7 for the proposed Project illustrates how the increments are calculated.

[c] The CEQA increment represents Alternative 3 minus CEQA baseline. The NEPA increment represents Alternative 3 minus NEPA baseline.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-15. Maximum Offsite NO_2 and CO Concentrations Associated with Operation of Alternative 3 with Mitigation

Pollutant	Averaging Time	Maximum Modeled Concentration of Alternative 3 (µg/m^3)	Background Concentration (µg/m^3)	Total Ground-Level Concentration (µg/m^3)	SCAQMD Threshold (µg/m^3)
NO_2	1-hour	1,669	263	**1,932**	338
	Annual	42.0	52.7	**94.7**	56.4
CO	1-hour	5,691	4,809	10,500	23,000
	8-hour	1,406	4,008	5,414	10,000

Notes:

[a] Exceedances of the thresholds are indicated in **bold**.

[b] The background concentrations were obtained from the North Long Beach Monitoring Station. The maximum concentrations during 2004, 2005, and 2006 were used.

[c] NO_2 concentrations were calculated assuming a 75 percent conversion rate from NO_X to NO_2 (SCAQMD, 2003c). This conversion rate assumes that the maximum receptor locations are located within 2,000 meters of the emission sources that contribute the most to the modeled concentrations.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-16. Maximum Offsite PM Concentrations Associated with Operation of Alternative 3 with Mitigation

	Maximum Modeled Concentration of Alternative 3 (μg/m[3])	Maximum Modeled Concentration of CEQA Baseline (μg/m[3])	Maximum Modeled Concentration of NEPA Baseline (μg/m[3])	Ground-Level Concentration CEQA Increment[c] (μg/m[3])	Ground-Level Concentration NEPA Increment[c] (μg/m[3])	SCAQMD Threshold (μg/m[3])
PM_{10} 24-hour	7.6	10.2	5.7	**4.3**	**4.1**	2.5
$PM_{2.5}$ 24-hour	5.4	9.4	3.8	**3.4**	**3.5**	2.5

Notes:

[a] Exceedances of the threshold are indicated in **bold**. The threshold for PM_{10} is an incremental threshold; therefore, the incremental concentration without background is compared to the threshold.

[b] The maximum concentrations and increments presented in this table might not occur at the same receptor location. This means that the increments cannot necessarily be determined by simply subtracting the baseline concentrations from the No Project concentration. The example provided in the discussion of Impact AQ-7 for the proposed Project illustrates how the increments are calculated.

[c] The CEQA increment represents Alternative 3 minus CEQA baseline. The NEPA increment represents Alternative 3 minus NEPA baseline.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-17. Maximum Offsite NO_2 and CO Concentrations Associated with Operation of Alternative 4 without Mitigation

Pollutant	Averaging Time	Maximum Modeled Concentration of Alternative 4 (μg/m[3])	Background Concentration (μg/m[3])	Total Ground-Level Concentration (μg/m[3])	SCAQMD Threshold (μg/m[3])
NO_2	1-hour	1,758	263	**2,021**	338
	Annual	48.5	52.7	**101.2**	56.4
CO	1-hour	1,520	4,809	6,329	23,000
	8-hour	381	4,008	4,389	10,000

Notes:

[a] Exceedances of the thresholds are indicated in **bold**.

[b] The background concentrations were obtained from the North Long Beach Monitoring Station. The maximum concentrations during 2004, 2005, and 2006 were used.

[c] NO_2 concentrations were calculated assuming a 75 percent conversion rate from NO_X to NO_2 (SCAQMD, 2003c). This conversion rate assumes that the maximum receptor locations are located within 2,000 meters of the emission sources that contribute the most to the modeled concentrations.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-18. Maximum Offsite PM Concentrations Associated with Operation of Alternative 4 without Mitigation

	Maximum Modeled Concentration of Alternative 4 (μg/m³)	Maximum Modeled Concentration of CEQA Baseline (μg/m³)	Maximum Modeled Concentration of NEPA Baseline (μg/m³)	Ground-Level Concentration CEQA Increment[c] (μg/m³)	Ground-Level Concentration NEPA Increment[c] (μg/m³)	SCAQMD Threshold (μg/m³)
PM_{10} 24-hour	13.8	10.2	5.7	**9.3**	**8.2**	2.5
$PM_{2.5}$ 24-hour	11.5	9.4	3.8	**7.6**	**7.7**	2.5

Notes:

[a] Exceedances of the threshold are indicated in **bold**. The threshold for PM_{10} is an incremental threshold; therefore, the incremental concentration without background is compared to the threshold.

[b] The maximum concentrations and increments presented in this table might not occur at the same receptor location. This means that the increments cannot necessarily be determined by simply subtracting the baseline concentrations from the No Project concentration. The example provided in the discussion of Impact AQ-7 for the proposed Project illustrates how the increments are calculated.

[c] The CEQA increment represents Alternative 4 minus CEQA baseline. The NEPA increment represents Alternative 4 minus NEPA baseline.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-19. Maximum Offsite NO_2 and CO Concentrations Associated with Operation of Alternative 4 with Mitigation

Pollutant	Averaging Time	Maximum Modeled Concentration of Alternative 4 (μg/m³)	Background Concentration (μg/m³)	Total Ground-Level Concentration (μg/m³)	SCAQMD Threshold (μg/m³)
NO_2	1-hour	1,921	263	**2,184**	338
	Annual	41.9	52.7	**94.6**	56.4
CO	1-hour	9,688	4,809	14,497	23,000
	8-hour	2,416	4,008	6,424	10,000

Notes:

[a] Exceedances of the thresholds are indicated in **bold**.

[b] The background concentrations were obtained from the North Long Beach Monitoring Station. The maximum concentrations during 2004, 2005, and 2006 were used.

[c] NO_2 concentrations were calculated assuming a 75 percent conversion rate from NO_X to NO_2 (SCAQMD, 2003c). This conversion rate assumes that the maximum receptor locations are located within 2,000 meters of the emission sources that contribute the most to the modeled concentrations.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-20. Maximum Offsite PM Concentrations Associated with Operation of Alternative 4 with Mitigation

	Maximum Modeled Concentration of Alternative 4 ($\mu g/m^3$)	Maximum Modeled Concentration of CEQA Baseline ($\mu g/m^3$)	Maximum Modeled Concentration of NEPA Baseline ($\mu g/m^3$)	Ground-Level Concentration CEQA Increment[c] ($\mu g/m^3$)	Ground-Level Concentration NEPA Increment[c] ($\mu g/m^3$)	SCAQMD Threshold ($\mu g/m^3$)
PM_{10} 24-hour	9.2	10.2	5.7	**6.5**	**6.2**	2.5
$PM_{2.5}$ 24-hour	7.1	9.4	3.8	**5.2**	**5.3**	2.5

Notes:

[a] Exceedances of the threshold are indicated in **bold**. The threshold for PM_{10} is an incremental threshold; therefore, the incremental concentration without background is compared to the threshold.

[b] The maximum concentrations and increments presented in this table might not occur at the same receptor location. This means that the increments cannot necessarily be determined by simply subtracting the baseline concentrations from the No Project concentration. The example provided in the discussion of Impact AQ-7 for the proposed Project illustrates how the increments are calculated.

[c] The CEQA increment represents Alternative 4 minus CEQA baseline. The NEPA increment represents Alternative 4 minus NEPA baseline.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-21. Maximum Offsite NO_2 and CO Concentrations Associated with Operation of Alternative 5 without Mitigation

Pollutant	Averaging Time	Maximum Modeled Concentration of Alternative 5 ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Ground-Level Concentration ($\mu g/m^3$)	SCAQMD Threshold ($\mu g/m^3$)
NO_2	1-hour	1,727	263	**1,990**	338
	Annual	47.8	52.7	**100.5**	56.4
CO	1-hour	775	4,809	5,584	23,000
	8-hour	200	4,008	4,208	10,000

Notes:

[a] Exceedances of the thresholds are indicated in **bold**.

[b] The background concentrations were obtained from the North Long Beach Monitoring Station. The maximum concentrations during 2004, 2005, and 2006 were used.

[c] NO_2 concentrations were calculated assuming a 75 percent conversion rate from NO_X to NO_2 (SCAQMD, 2003c). This conversion rate assumes that the maximum receptor locations are located within 2,000 meters of the emission sources that contribute the most to the modeled concentrations.

Table E2.5-22. Maximum Offsite PM Concentrations Associated with Operation of Alternative 5 without Mitigation

	Maximum Modeled Concentration of Alternative 5 (μg/m^3)	Maximum Modeled Concentration of CEQA Baseline (μg/m^3)	Maximum Modeled Concentration of NEPA Baseline (μg/m^3)	Ground-Level Concentration CEQA Increment[c] (μg/m^3)	Ground-Level Concentration NEPA Increment[c] (μg/m^3)	SCAQMD Threshold (μg/m^3)
PM_{10} 24-hour	13.8	10.2	5.7	**10.8**	**8.6**	2.5
$PM_{2.5}$ 24-hour	12.5	9.4	3.8	**9.9**	**9.1**	2.5

Notes:

[a] Exceedances of the threshold are indicated in **bold**. The threshold for PM_{10} is an incremental threshold; therefore, the incremental concentration without background is compared to the threshold.

[b] The maximum concentrations and increments presented in this table might not occur at the same receptor location. This means that the increments cannot necessarily be determined by simply subtracting the baseline concentrations from the No Project concentration. The example provided in the discussion of Impact AQ-7 for the proposed Project illustrates how the increments are calculated.

[c] The CEQA increment represents Alternative 5 minus CEQA baseline. The NEPA increment represents Alternative 5 minus NEPA baseline.

Table E2.5-23. Maximum Offsite NO_2 and CO Concentrations Associated with Operation of Alternative 5 with Mitigation

Pollutant	Averaging Time	Maximum Modeled Concentration of Alternative 5 (μg/m^3)	Background Concentration (μg/m^3)	Total Ground-Level Concentration (μg/m^3)	SCAQMD Threshold (μg/m^3)
NO_2	1-hour	1,623	263	**1,886**	338
	Annual	36.1	52.7	**88.8**	56.4
CO	1-hour	5,661	4,809	10,470	23,000
	8-hour	1,457	4,008	5,465	10,000

Notes:

[a] Exceedances of the thresholds are indicated in **bold**.

[b] The background concentrations were obtained from the North Long Beach Monitoring Station. The maximum concentrations during 2004, 2005, and 2006 were used.

[c] NO_2 concentrations were calculated assuming a 75 percent conversion rate from NO_X to NO_2 (SCAQMD, 2003c). This conversion rate assumes that the maximum receptor locations are located within 2,000 meters of the emission sources that contribute the most to the modeled concentrations.

Table E2.5-24. Maximum Offsite PM Concentrations Associated with Operation of Alternative 5 with Mitigation

	Maximum Modeled Concentration of Alternative 5 (μg/m^3)	Maximum Modeled Concentration of CEQA Baseline (μg/m^3)	Maximum Modeled Concentration of NEPA Baseline (μg/m^3)	Ground-Level Concentration CEQA Increment[c] (μg/m^3)	Ground-Level Concentration NEPA Increment[c] (μg/m^3)	SCAQMD Threshold (μg/m^3)
PM_{10} 24-hour	5.6	10.2	5.7	**3.9**	**3.7**	2.5
$PM_{2.5}$ 24-hour	5.1	9.4	3.8	**3.3**	**3.4**	2.5

Notes:

[a] Exceedances of the threshold are indicated in **bold**. The threshold for PM_{10} is an incremental threshold; therefore, the incremental concentration without background is compared to the threshold.

[b] The maximum concentrations and increments presented in this table might not occur at the same receptor location. This means that the increments cannot necessarily be determined by simply subtracting the baseline concentrations from the No Project concentration. The example provided in the discussion of Impact AQ-7 for the proposed Project illustrates how the increments are calculated.

[c] The CEQA increment represents Alternative 5 minus CEQA baseline. The NEPA increment represents Alternative 5 minus NEPA baseline.

Table E2.5-25. Maximum Offsite NO_2 and CO Concentrations Associated with Operation of Alternative 6 without Mitigation

Pollutant	Averaging Time	Maximum Modeled Concentration of Alternative 6 (μg/m^3)	Background Concentration (μg/m^3)	Total Ground-Level Concentration (μg/m^3)	SCAQMD Threshold (μg/m^3)
NO_2	1-hour	3,500	263	**3,763**	338
	Annual	132.5	52.7	**185.2**	56.4
CO	1-hour	3,689	4,809	8,498	23,000
	8-hour	910	4,008	4,918	10,000

Notes:

[a] Exceedances of the thresholds are indicated in **bold**.

[b] The background concentrations were obtained from the North Long Beach Monitoring Station. The maximum concentrations during 2004, 2005, and 2006 were used.

[c] NO_2 concentrations were calculated assuming a 75 percent conversion rate from NO_X to NO_2 (SCAQMD, 2003c). This conversion rate assumes that the maximum receptor locations are located within 2,000 meters of the emission sources that contribute the most to the modeled concentrations.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-26. Maximum Offsite PM Concentrations Associated with Operation of Alternative 6 without Mitigation

	Maximum Modeled Concentration of Alternative 6 (μg/m³)	Maximum Modeled Concentration of CEQA Baseline (μg/m³)	Maximum Modeled Concentration of NEPA Baseline (μg/m³)	Ground-Level Concentration CEQA Increment[c] (μg/m³)	Ground-Level Concentration NEPA Increment[c] (μg/m³)	SCAQMD Threshold (μg/m³)
PM_{10} 24-hour	39.2	10.2	5.7	**30.3**	**33.5**	2.5
$PM_{2.5}$ 24-hour	35.9	9.4	3.8	**27.7**	**32.1**	2.5

Notes:

[a] Exceedances of the threshold are indicated in **bold**. The threshold for PM_{10} is an incremental threshold; therefore, the incremental concentration without background is compared to the threshold.

[b] The maximum concentrations and increments presented in this table might not occur at the same receptor location. This means that the increments cannot necessarily be determined by simply subtracting the baseline concentrations from the No Project concentration. The example provided in the discussion of Impact AQ-7 for the proposed Project illustrates how the increments are calculated.

[c] The CEQA increment represents Alternative 6 minus CEQA baseline. The NEPA increment represents Alternative 6 minus NEPA baseline.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-27. Maximum Offsite NO_2 and CO Concentrations Associated with Operation of Alternative 6 with Mitigation

Pollutant	Averaging Time	Maximum Modeled Concentration of Alternative 6 (μg/m³)	Background Concentration (μg/m³)	Total Ground-Level Concentration (μg/m³)	SCAQMD Threshold (μg/m³)
NO_2	1-hour	1,964	263	**2,228**	338
	Annual	66.7	52.7	**119.4**	56.4
CO	1-hour	3,590	4,809	8,399	23,000
	8-hour	885	4,008	4,893	10,000

Notes:

[a] Exceedances of the thresholds are indicated in **bold**.

[b] The background concentrations were obtained from the North Long Beach Monitoring Station. The maximum concentrations during 2004, 2005, and 2006 were used.

[c] NO_2 concentrations were calculated assuming a 75 percent conversion rate from NO_X to NO_2 (SCAQMD, 2003c). This conversion rate assumes that the maximum receptor locations are located within 2,000 meters of the emission sources that contribute the most to the modeled concentrations.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

Table E2.5-28. Maximum Offsite PM Concentrations Associated with Operation of Alternative 6 with Mitigation

	Maximum Modeled Concentration of Alternative 6 (μg/m³)	Maximum Modeled Concentration of CEQA Baseline (μg/m³)	Maximum Modeled Concentration of NEPA Baseline (μg/m³)	Ground-Level Concentration CEQA Increment[c] (μg/m³)	Ground-Level Concentration NEPA Increment[c] (μg/m³)	SCAQMD Threshold (μg/m³)
PM_{10} 24-hour	23.9	10.2	5.7	**16.8**	**18.2**	2.5
$PM_{2.5}$ 24-hour	20.1	9.4	3.8	**14.0**	**16.3**	2.5

Notes:

[a] Exceedances of the threshold are indicated in **bold**. The threshold for PM_{10} is an incremental threshold; therefore, the incremental concentration without background is compared to the threshold.

[b] The maximum concentrations and increments presented in this table might not occur at the same receptor location. This means that the increments cannot necessarily be determined by simply subtracting the baseline concentrations from the No Project concentration. The example provided in the discussion of Impact AQ-7 for the proposed Project illustrates how the increments are calculated.

[c] The CEQA increment represents Alternative 6 minus CEQA baseline. The NEPA increment represents Alternative 6 minus NEPA baseline.

[d] Phase II/III construction emissions were modeled with the operational emissions in situations where the highest emissions occur during the overlap period (2010).

E2.6 References

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