# Appendix B2
# Air Dispersion Modeling

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# 1.0 Introduction

This appendix describes the methods and results of air dispersion modeling that predict the ground-level concentrations of criteria pollutants from past and future operation of the China Shipping Terminal at Berths 97-109. The analysis modeled the following concentrations:

- 1-hour and annual nitrogen dioxide ($NO_2$);
- 1-hour and 24-hour sulfur dioxide ($SO_2$);
- 1-hour and 8-hour carbon monoxide (CO);
- 24-hour and annual particulate matter less than ten microns ($PM_{10}$); and
- 24-hour particulate matter less than 2.5 microns ($PM_{2.5}$).

The following two scenarios were analyzed:

- **Revised Project:** this scenario is the proposed Project for which this Supplemental EIR (SEIR) has been prepared. As described in Chapter 2 of the Recirculated Draft SEIR, the 2008 EIS/EIR for the China Shipping Terminal included a number of mitigation measures, some of which have yet to be fully implemented for various reasons. The Revised Project consists of continued future operation of the terminal under the new or modified mitigation measures described in Chapter 1 of the Final SEIR. Revised Project impacts were evaluated for future years 2023, 2030, 2036, and 2045. The analysis for the Revised Project also evaluated actual emissions associated with terminal operation in two past years (2012 and 2014) and the present year (2018).

- **FEIR Mitigated Scenario:** this scenario represents operation of the terminal as it would have been and would be with timely implementation of all 2008 EIS/EIR mitigation measures. The FEIR Mitigated Scenario was evaluated for the same past, present, and future analysis years as the Revised Project. Analysis of the FEIR Mitigated Scenario is provided for informational purposes to compare to the Revised Project.

For more details about the baseline and scenarios, see Section 2.0 in Appendix B1.

Air quality impacts of the two Project scenarios described above were analyzed relative to a 2008 Actual Baseline, which represents the actual emissions associated with terminal operation in 2008. As discussed in Section 3.1.4.2 of the Recirculated Draft SEIR, the terminal was in compliance with applicable 2008 EIS/EIR mitigation measures during the 2008 Actual Baseline year.

Due to improvements in procedures and assumptions used to calculate emissions and in atmospheric dispersion modeling procedures used to estimate resulting pollutant concentrations, it is not possible to directly compare air quality impacts presented in the 2008 Final EIS/EIR with impacts calculated for this Final SEIR, nor is it possible to reproduce the outdated methods, models, and procedures used to analyze air quality impacts in the 2008 EIS/EIR. Therefore, this appendix presents an evaluation of air quality impacts using current, state-of-the-art emission estimation and air quality modeling procedures. The emission estimation procedures are described more fully in Appendix B1.

The air dispersion modeling was performed using the U.S. Environmental Protection Agency's (USEPA's) AERMOD Modeling system, version 18081 (USEPA, 2018). The modeling methodology was based on the USEPA's *Guideline on Air Quality Models* (USEPA, 2017) and the South Coast Air Quality Management District's (SCAQMD's) Modeling Guidance for AERMOD (SCAQMD, 2018). Ambient concentrations of $NO_2$, CO, $SO_2$, $PM_{10}$, and $PM_{2.5}$ were modeled for the scenarios and 2008 Actual Baseline. The maximum predicted impacts for the Project scenarios were compared to the relevant SCAQMD air quality significance thresholds.

**Updates related to fine grid dispersion modeling**

Six fine-grid dispersion model runs that were not performed for the Recirculated Draft SEIR were modeled for the Final SEIR. As a result, several $NO_2$ concentrations have been revised to slightly higher values and their locations have moved slightly. The revised tables and figures are included in the Final SEIR. All of the concentrations to which revisions have been made would remain well below the significance thresholds. Therefore, this revision would not change any of the significance findings in the Recirculated Draft SEIR.

# 2.0 Estimation of Emissions Used in the Air Dispersion Modeling

## 2.1 Emission Source Identification

The following operational emission sources were modeled in AERMOD:

- Container ships transiting between the SCAQMD overwater boundary and the terminal (about 40 nautical miles), anchoring while waiting for an available berth, and hoteling while at berth. Ship emission sources include propulsion engines, auxiliary engines, and boilers.
- Tugboats used to assist ships while arriving and departing the Port. Tugboat emission sources include propulsion and auxiliary engines.
- Locomotives performing switching activities at the on-dock rail yard; and line-haul locomotives moving and idling at the on-dock rail yard, and hauling trains to and from the yard. Locomotive emission sources include engine exhaust.
- Cargo handling equipment working both on-terminal and handling China Shipping-related containers at the on-dock rail yard. Cargo handling equipment emission sources include engine exhaust.
- Trucks idling at the in-gate, out-gate, and on-terminal; driving on-terminal; and driving off-terminal along the primary truck routes. Truck emission sources include engine exhaust, tire wear, brake wear, and road dust.
- Worker vehicles driving both on- and off-terminal. Worker vehicle emission sources include engine exhaust, tire wear, brake wear, and road dust.

## 2.2 Derivation of Emissions for the Pollutant Averaging Periods

Section 3.1.4.1 of the Recirculated Draft SEIR and Appendix B1 describe the methodology for estimating annual, peak day, peak 8-hour, and peak 1-hour emissions associated with terminal operations. In general, peak day emissions were calculated for each source category (container ships, tugboats, locomotives, cargo handling equipment, trucks, and worker vehicles) based on expected maximum daily activity levels within the annual period being modeled. Peak 1-hour and 8-hour emissions for cargo handling equipment, trucks, and worker vehicles were calculated internally by AERMOD based on the assumption that the peak daily source emissions follow the time-of-day profiles listed in Table B2-2. Peak 1-hour and 8-hour emissions for container ships, tugboats, and locomotives were calculated outside of AERMOD as described in Appendix B1 and modeled directly in AERMOD.

# 3.0 Dispersion Modeling Approach

## 3.1 Dispersion Model Selection and Inputs

Air dispersion modeling was performed using the USEPA AERMOD dispersion model, version 18081 (USEPA, 2018), based on the *Guideline on Air Quality Models* (USEPA, 2017) and SCAQMD Modeling Guidance for AERMOD (SCAQMD, 2018). AERMOD is a steady-state, multiple source, Gaussian dispersion model designed for applications which include areas of ground elevations that exceed emission source stack heights. AERMOD is well suited for this analysis because it is (1) accepted by the modeling community and regulatory agencies due to of its ability to provide reasonable results for large industrial projects with multiple emission sources, (2) annual sets of hourly meteorological data are available in AERMOD format, and (3) the model can handle various sources types, including point, area, line, and volume. Finally, AERMOD has been approved by the USEPA and SCAQMD for analysis of mobile sources.

### 3.1.1 Emission Source Modeling Representation

Operational emission sources were represented in AERMOD as follows:

- Container ships in transit were simulated as a series of separated volume sources extending from Berths 100 and 102 to the South Coast Air Basin (SCAB) overwater boundary. Volume source spacing was 100 meters within the harbor, 500 meters in the precautionary zone, 1,000 meters between the precautionary zone and 20 nautical miles from Point Fermin, and 2,000 meters between 20 nautical miles and the SCAB overwater boundary. Transit emissions were apportioned 75 percent to the north trans-Pacific route, and 25 percent to the west route, based on arrival and departure statistics for the terminal (Ramboll Environ, 2016).
- Container ships at berth were modeled as point sources located adjacent to Berths 100 and 102.
- Container ships at anchorage were modeled as an area source within the harbor.

- Tugboats were modeled as a series of separated volume sources extending from Berths 100 and 102 to the Port breakwater. The volume source spacing was 100 meters.
- Locomotives were modeled as a series of contiguous line sources along the arriving and departing routes as well as within the on-dock rail yard. Locomotives were modeled as far north as Sepulveda Blvd, about 4.5 miles northeast of the terminal. A sensitivity AERMOD run showed that this range was sufficient to adequately capture maximum pollutant concentrations.
- Cargo handling equipment was modeled as area sources positioned over most of the terminal and the on-dock rail yard.
- Trucks driving and idling on-site were modeled as area sources positioned over the in-gate, out-gate, and terminal.
- Trucks and worker vehicles driving off-site were modeled a series of contiguous line sources along the primary travel routes. They were modeled as far north as Sepulveda Blvd, about 4.5 miles northeast of the terminal. A sensitivity AERMOD run showed that this range was sufficient to adequately capture maximum pollutant concentrations.
- Worker vehicles on-site were modeled as area sources positioned over the entrance roads and on-terminal parking lots.

Table B2-1 presents the source parameters used in the dispersion modeling of operational emissions. The source parameters are consistent with those developed and used in prior LAHD NEPA/CEQA documents for container terminals, including the 2008 EIS/EIR for the China Shipping Terminal (LAHD 2008; LAHD 2011; LAHD 2014). The locations of the emission sources as modeled are shown in Figures B2-1 through B2-3.

## Table B2-1. AERMOD Source Parameters

| Source Description | AERMOD Source Type | Release Height (m) [a] | Initial Vertical Dimension (m) [b] | Stack Exit Velocity (m/s) | Stack Exit Temp. (K) | Stack Inside Diameter (m) |
|---|---|---|---|---|---|---|
| Ships – Fairway and Precautionary Area Transit | Volume | 49.1 | 11.4 | -- | -- | -- |
| Ships – Harbor Transit | Volume | 59.1 | 13.7 | -- | -- | -- |
| Ships – Turning and Docking Near-Berth | Volume | 78.6 | 18.3 | -- | -- | -- |
| Ships - At Berth - Auxiliary Engines | Point | 44.5 | -- | 7.5 | 583 | 0.539 |
| Ships - At Berth – Boilers | Point | 39.9 | -- | 18.24 | 559 | 0.494 |
| Ships - At Anchorage | Area | 44.5 | 10.3 | -- | -- | -- |
| Tugboats | Volume | 15.2 | 3.5 | -- | -- | -- |
| Locomotives - Offsite – Day [c] | Line | 5.6 | 2.6 | -- | -- | -- |
| Locomotives - Offsite – Night | Line | 14.6 | 6.79 | -- | -- | -- |
| Locomotives - Onsite – Day | Line | 6.64 | 3.08 | -- | -- | -- |
| Locomotives - Onsite – Night | Line | 13.56 | 6.31 | -- | -- | -- |
| Cargo Handling Equipment (except RTGs) | Area | 4.57 | 1.06 | -- | -- | -- |
| Rubber Tired Gantry (RTG) Cranes | Area | 12.5 | 2.9 | -- | -- | -- |
| Trucks | Area, Line [d] | 4.57 | 1.06 | -- | -- | -- |
| Worker Vehicles | Area, Line [d] | 0.61 | 0.14 | -- | -- | -- |

Notes:

a. The release height for point sources in this table represents the actual release height of the exhaust above ground (or water, in this case). AERMOD then accounts for additional plume rise due to the upward momentum and buoyancy of the stack exhaust gas, based on the exit velocity, exit temperature, and stack diameter. By contrast, AERMOD does not calculate any additional plume rise for volume, area, and line sources. Therefore, the release heights presented in this table for volume, area, and line sources have been adjusted higher than the actual exhaust release heights in many cases to account for plume rise due to upward momentum and buoyancy of the stack exhaust gas.

b. The initial vertical dimension of the plume ($\sigma_z$) was determined by dividing the initial vertical thickness by 4.3 for elevated releases and by 2.15 for ground-based releases.

c. Locomotive plume heights were derived from the *Roseville Rail Yard Study* (CARB, 2004). The plume heights vary by day versus night due to differences in atmospheric stability conditions. The line source release heights were set equal to the plume heights because line sources do not have a plume rise algorithm in AERMOD.

d. Trucks and worker vehicles were modeled with area sources on-site and line sources off-site.

e. Source parameters are consistent with prior LAHD CEQA documents for container terminals (LAHD 2008; LAHD 2011; LAHD 2014).

**Figure B2-1. AERMOD Source Representation – Ship (OGV) Transits**

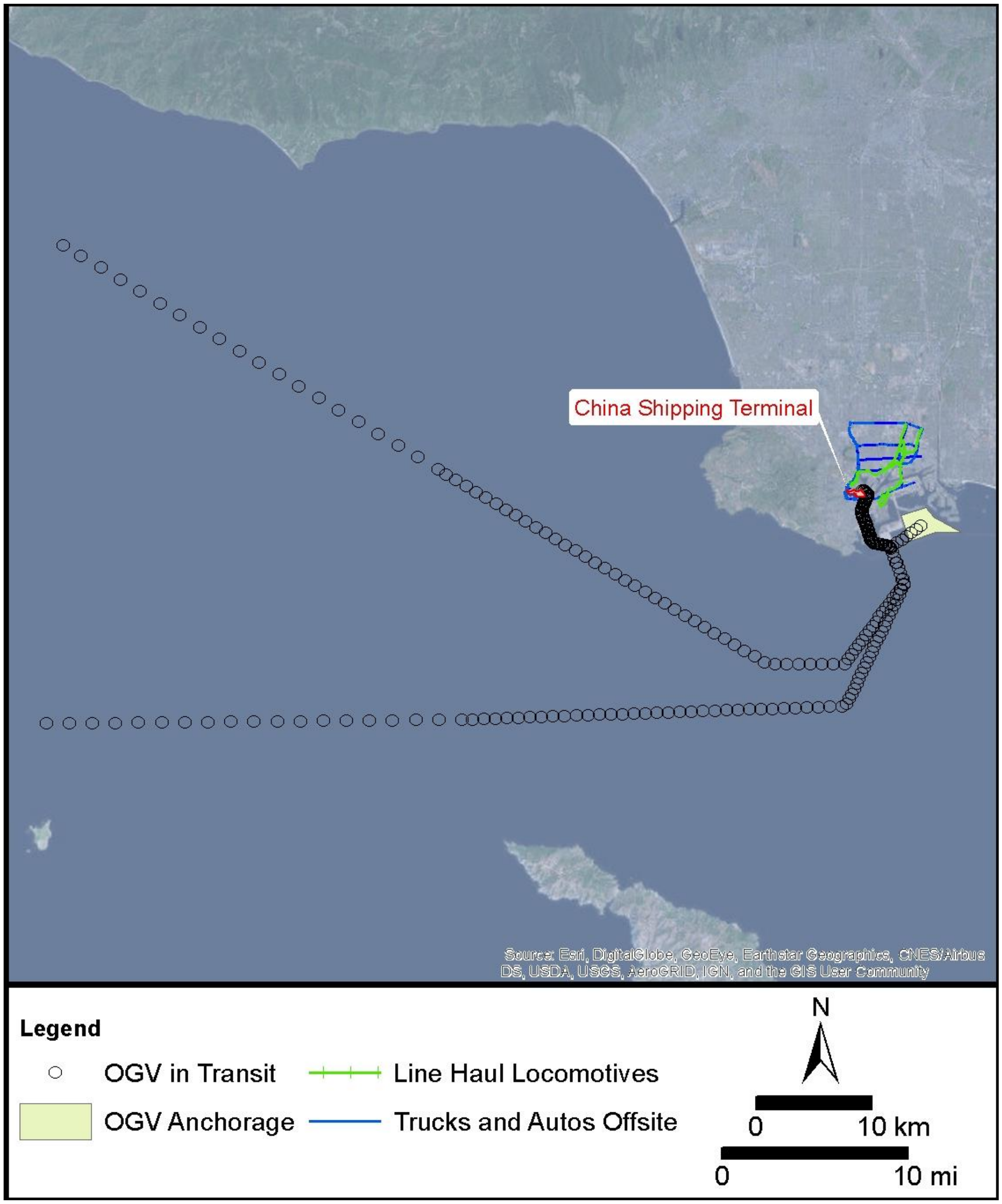


**Figure B2-2. AERMOD Source Representation – OGV Maneuvering and Anchorage, Off-site Line Haul Locomotives, and Off-site Trucks and Worker Vehicles**

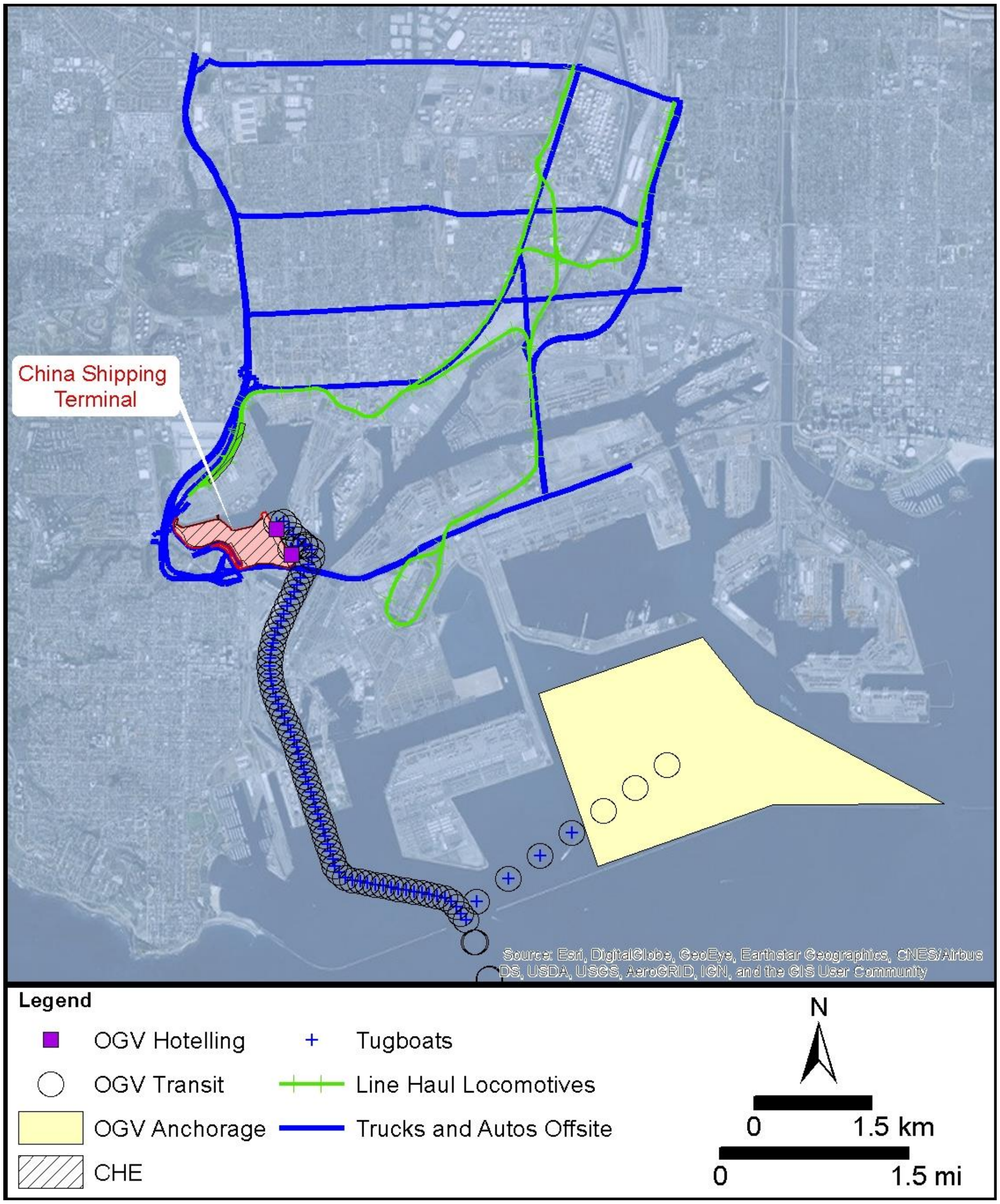
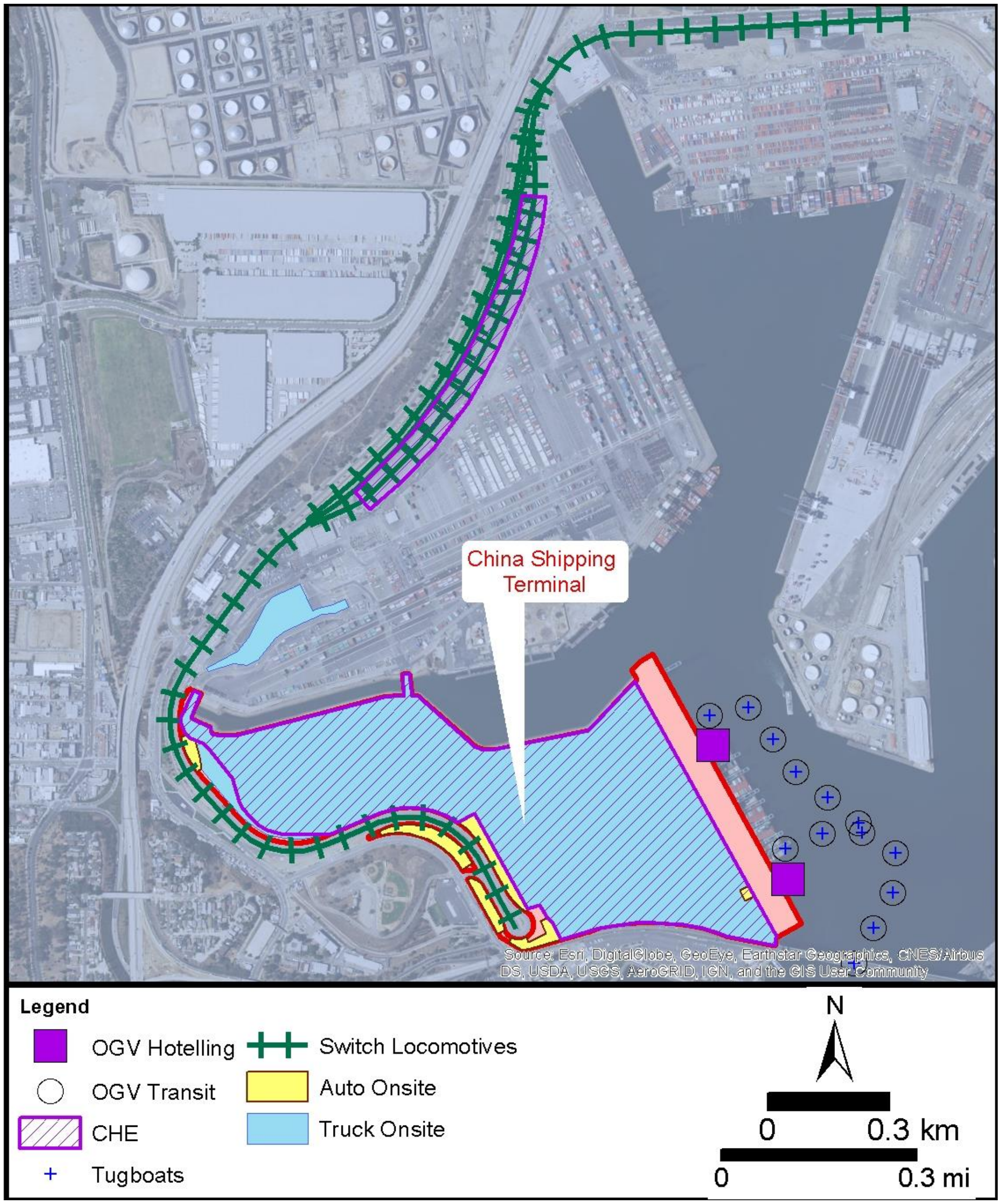


**Figure B2-3. AERMOD Source Representation – OGV Hoteling, Cargo Handling Equipment (CHE), On-site Trucks and Worker Vehicles, and Switch Locomotives**



## 3.1.2 Meteorological Data

The complex interaction of the ocean, land, and Palos Verdes hills near the Port may result in significant variations in wind patterns over relatively short distances (LAHD 2010). POLA and POLB currently operate monitoring stations that collect meteorological data from several locations within and near port boundaries. For this dispersion analysis, the meteorological data collected at the Wilmington Community Station, located at Saints Peter and Paul School, were used for dispersion modeling. The station is located about 1.6 mile north-northeast of the China Shipping terminal and is considered the most representative meteorological station for the terminal in accordance with the "Sphere of Influence" analysis conducted by POLA and POLB in 2010 (LAHD 2010).

The meteorological data used in AERMOD were collected between September 2006 and August 2007, the first complete 12-month period recorded at all six of the site-specific monitoring stations operated by the Ports of Los Angeles and Long Beach. The use of one year of meteorological data is consistent with USEPA guidelines, which state that "at least one year of site-specific" data are required" (USEPA, 2017). For project-to-project consistency, this same meteorological period has been used in numerous POLA and POLB EIRs since 2007.

The meteorological data were processed in 2013 using the USEPA's approved AERMET (version 12345) meteorological data preprocessor (USEPA, 2018b). To promote project-to-project consistency, the Ports reprocess the data with updated versions of AERMET only when necessary, such as when a new version of AERMET is different enough to substantially affect the AERMOD results for the Port projects. A review of USEPA-prepared test cases for various versions of AERMET and AERMOD (USEPA, 2018c) confirmed that the differences between AERMET versions 12345 and 18081 would have a negligible effect on the AERMOD-predicted concentrations for the types of sources modeled in this report. Therefore, the meteorological data processed with AERMET 12345 was used for this analysis. Moreover, as part of the data processing effort, the 2006-2007 meteorological data were compared to the more recent meteorological data collected during years 2009 to 2012. It was determined that the 2006-2007 data period is representative in comparison to the 2009 to 2012 data period. The evaluation showed that the average wind speed and wind patterns of the original data period are very similar to that of the 2009 to 2012 data period across the stations at both POLA and POLB. Therefore, it was concluded that the original data period is representative (ENVIRON 2013).

## 3.1.3 Model Options

Regulatory default technical options were selected in AERMOD for all pollutants. Consistent with SCAQMD and EPA guidance (SCAQMD, 2018; USEPA, 2010; USEPA, 2011a; USEPA, 2014; USEPA, 2017), the conversion of nitrogen oxide ($NO_X$) to $NO_2$ in ambient air was simulated in AERMOD using the Ozone Limiting Method (OLM). The following in-stack $NO_2/NO_X$ ratios were assumed: 0.1 for container ship propulsion engines and boilers (derived from USEPA, 2000); 0.11 for diesel heavy-duty trucks (CAPCOA, 2011); 0.25 for worker vehicles (CAPCOA, 2011); and 0.20 for all other diesel internal combustion engines, including ship auxiliary engines, tugboats, locomotives, and cargo handling equipment (CAPCOA, 2011). For the OLM, AERMOD used hourly ambient ozone concentration data from the SCAQMD's North Long Beach monitoring station.

As recommended by the SCAQMD (2018), all sources were modeled with urban dispersion coefficients. An urban population of 9,818,605, representative of Los Angeles County, was used in AERMOD. Receptor and source base elevations were determined from USGS 1/3-arcsecond National Elevation Dataset (NED) files using AERMAP, version 18081 (USEPA 2018d). All coordinates were referenced to UTM NAD83, Zone 11.

### 3.1.4 Temporal Distribution Assumptions

For dispersion modeling purposes, operational emissions were assumed to occur during the times specified in Table B2-2. Emissions were assumed to be uniformly distributed during the specific time periods described in the table. The same temporal distribution assumptions were used for the FEIR Mitigated, Revised Project and 2008 Actual Baseline.

**Table B2-2. Temporal Distribution of Emissions in AERMOD**

| Source Description | Temporal Distribution | |
|---|---|---|
| Container Ships | 24 hours per day | |
| Tugboats | 24 hours per day | |
| Locomotives | 24 hours per day | |
| Cargo Handling Equipment [a] | 10.0 percent 12 a.m. – 6 a.m.<br>25.0 percent 6 a.m. – 12 p.m.<br>32.5 percent 12 p.m. – 6 p.m.<br>32.5 percent 6 p.m. – 12 a.m. | |
| Trucks [b] | 4.46 percent 12 a.m. – 1 a.m.<br>3.50 percent 1 a.m. – 2 a.m.<br>1.33 percent 2 a.m. – 3 a.m.<br>0.38 percent 3 a.m. – 4 a.m.<br>0.38 percent 4 a.m. – 5 a.m.<br>0.42 percent 5 a.m. – 6 a.m.<br>0.46 percent 6 a.m. – 7 a.m.<br>1.13 percent 7 a.m. – 8 a.m.<br>5.38 percent 8 a.m. – 9 a.m.<br>6.08 percent 9 a.m. – 10 a.m.<br>6.00 percent 10 a.m. – 11 a.m.<br>6.38 percent 11 a.m. – 12 p.m. | 5.21 percent 12 p.m. – 1 p.m.<br>7.04 percent 1 p.m. – 2 p.m.<br>6.67 percent 2 p.m. – 3 p.m.<br>6.21 percent 3 p.m. – 4 p.m.<br>4.54 percent 4 p.m. – 5 p.m.<br>2.63 percent 5 p.m. – 6 p.m.<br>5.96 percent 6 p.m. – 7 p.m.<br>6.25 percent 7 p.m. – 8 p.m.<br>5.63 percent 8 p.m. – 9 p.m.<br>5.25 percent 9 p.m. – 10 p.m.<br>3.54 percent 10 p.m. – 11 p.m.<br>5.21 percent 11 p.m. – 12 a.m. |
| Worker Vehicles | Same distribution as trucks | |

Notes:
[a] The temporal distribution for cargo handling equipment was derived from the truck distribution since a correlation exists between cargo handling and drayage truck visits. The truck factors were grouped into four 6-hour blocks to give less hour-by-hour variability than trucks because of a more steady-state workforce operating the cargo handling equipment.
[b] The temporal distribution for trucks was provided by the traffic study.

### 3.1.5 Receptor Locations

Cartesian coordinate receptor grids were used to provide adequate spatial coverage surrounding the Project area to assess ground-level pollution concentrations, identify the extent of impacts, and identify maximum impact locations. Initial AERMOD runs were conducted with a 22 by 12 kilometer (km) coarse grid, with receptors placed 1,000 meters (m) apart, centered over the Project site. Embedded within this receptor grid were additional receptors, placed 500 m apart, covering an area 9 km x 12 km. Also embedded were additional receptors, placed 250 m apart, covering an area 7.5 km x 10.5 km in which maximum concentrations were anticipated to occur.

Once the locations of the maximum concentrations were identified on the aforementioned coarse grid, additional AERMOD runs were conducted with grids of receptors, placed 50 m apart, centered over locations of the maximum coarse grid concentrations and along the China Shipping Terminal boundary. Receptors over water and in modeled roadway and rail traffic lanes were not considered in determining the maximum receptor locations because any human exposure there would be brief and transient.

Figures B2-4 and B2-5 show the receptor grids used in AERMOD for criteria pollutants.

**Figure B2-4. AERMOD Fine and Coarse Grid Receptors (Far Field)**

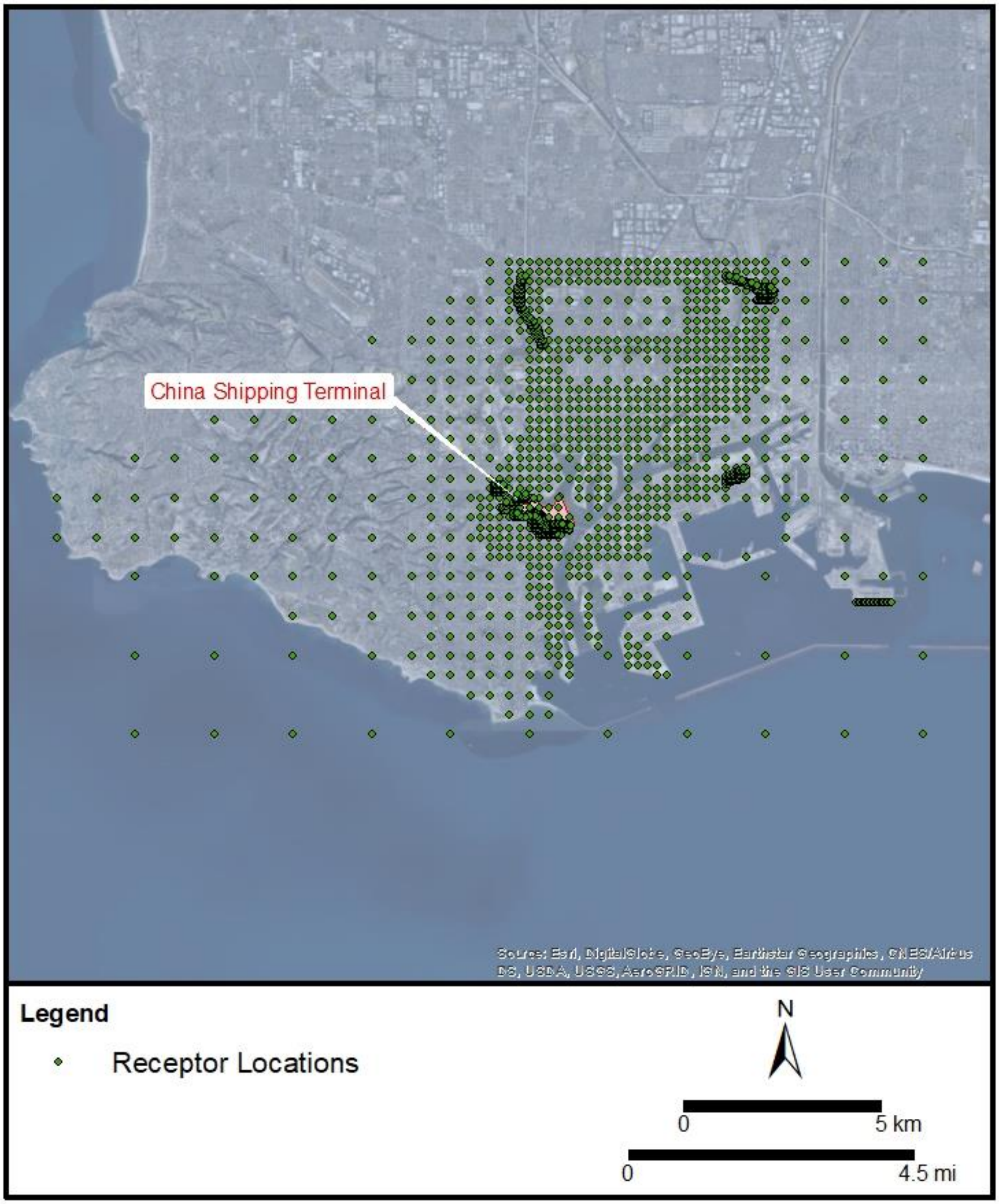
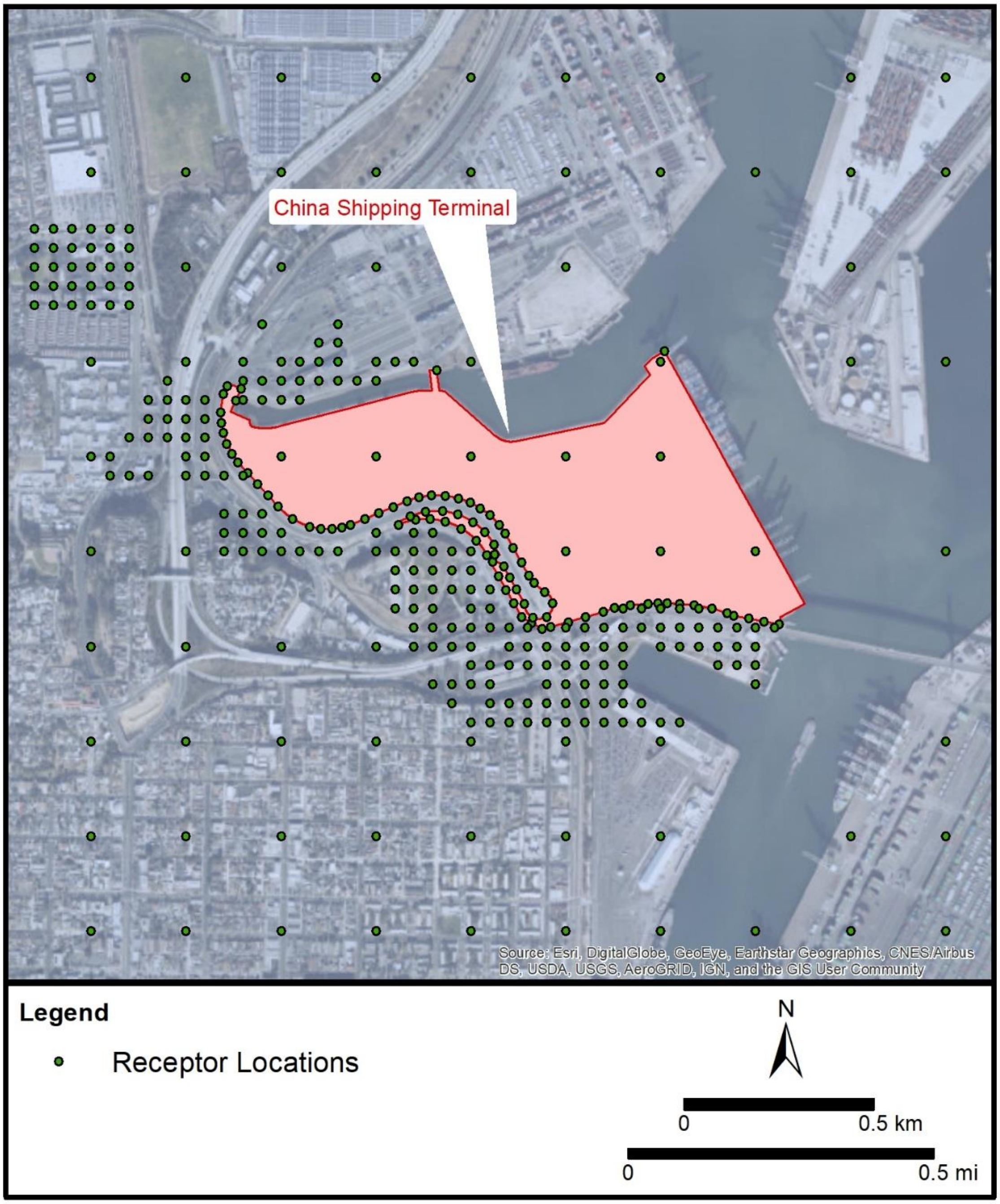


**Figure B2-5. AERMOD Fine and Coarse Grid Receptors (Near Field)**



# 3.2 Methodology for Determination of Impacts

$NO_2$, $PM_{10}$ and $PM_{2.5}$ concentrations associated with the Revised Project and FEIR Mitigated Scenario were modeled for each analysis year (2012, 2014, 2018, 2023, 2030, 2036, and 2045). Because prior Port projects have shown that $SO_2$ and CO are unlikely to exceed the significance thresholds, a conservative screening approach was used for $SO_2$ and CO where each AERMOD source was modeled with its maximum emissions over all analysis years. Thus, single worst case emission scenarios were modeled for CO and $SO_2$, whereas individual analysis years were modeled for $NO_2$, $PM_{2.5}$ and $PM_{10}$. The pollutant concentrations modeled by AERMOD were compared to the significance thresholds in Table B2-3 to assess impacts.

## 3.2.1 Methodology for $NO_2$, $SO_2$, and CO

The significance concentration thresholds for $NO_2$, $SO_2$, and CO are absolute thresholds based on the ambient air quality standards. Therefore, modeled Project concentration increments were added to ambient background concentrations to yield total concentrations. The modeled Project concentration increment is the modeled pollutant concentration under Project conditions minus the modeled pollutant concentration under 2008 Actual Baseline conditions, determined at each modeled receptor. The background concentration represents the maximum ambient concentration in the vicinity of the Project site, excluding the incremental contribution from the Revised Project or FEIR Mitigated Scenario. This approach for determining total concentrations was endorsed by the SCAQMD (SCAQMD 2012a and SCAMQD 2012b). Significance was determined by comparing the modeled receptors with the greatest total concentrations to the significance thresholds.

Ambient background concentrations were obtained from the Port's Wilmington Community Station at Saints Peter and Paul School. This air monitoring station is part of the Port's site-specific monitoring network, and therefore captures the contributions to ambient air pollutant levels from the Port including the China Shipping Terminal. The three most recent years of monitoring data, 2015-2017, were used to determine the background concentrations for the modeled analysis years 2018 through 2045. For analysis years 2012 and 2014, the three years of monitoring data leading up to and including the analysis years were used to determine the background concentrations. Therefore, 2010-2012 monitoring data were used for analysis year 2012, and 2012-2014 monitoring data were used for analysis year 2014. Tables B2-4, B2-5, and B2-6 show the derivation of the background concentrations used in this analysis.

To be consistent with the federal 1-hour $NO_2$ standard, the modeled federal 1-hour $NO_2$ concentrations represent the 98th percentile (8th highest) of the annual distribution of daily maximum 1-hour concentrations. Although compliance with the federal 1-hour $NO_2$ standard is based on a three-year average of the 98th percentile 1-hour concentrations, the EPA states that the use of one or more years of available site specific meteorological data serves as an unbiased estimate of the 3-year average for purposes of modeling demonstrations of compliance with the NAAQS (EPA, 2010). All other modeled pollutant concentrations, including the state 1-hour $NO_2$ concentration, represent the highest concentrations over the entire year of meteorological data.

## 3.2.2 Methodology for $PM_{10}$ and $PM_{2.5}$

The significance concentration thresholds for $PM_{10}$ and $PM_{2.5}$ are incremental thresholds. Therefore, the modeled Project concentration increments (Project minus 2008 Actual Baseline) were compared directly to the thresholds without adding background concentrations. Significance was determined by comparing the modeled receptors with the greatest increments to the thresholds.

**Table B2-3: SCAQMD Significance Thresholds for Operations**

| Air Pollutant | Operation Ambient Concentration Threshold |
|---|---|
| Nitrogen Dioxide ($NO_2$)[a] | |
| 1-hour average (federal)[b] | 0.100 ppm (188 $\mu g/m^3$) |
| 1-hour average (state) | 0.18 ppm (339 $\mu g/m^3$) |
| Annual average (federal)[c] | 0.0534 ppm (100 $\mu g/m^3$) |
| Annual average (state) | 0.030 ppm (57 $\mu g/m^3$) |
| Sulfur Dioxide ($SO_2$)[a] | |
| 1-hour average (federal)[d] | 0.075 ppm (196 $\mu g/m^3$) |
| 1-hour average (state) | 0.250 ppm (655 $\mu g/m^3$) |
| 24-hour average | 0.040 ppm (105 $\mu g/m^3$) |
| Carbon Monoxide (CO)[a] | |
| 1-hour average | 20 ppm (23,000 $\mu g/m^3$) |
| 8-hour average | 9.0 ppm (10,000 $\mu g/m^3$) |
| Particulates ($PM_{10}$ or $PM_{2.5}$)[e] | |
| 24-hour average ($PM_{10}$ and $PM_{2.5}$) | 2.5 $\mu g/m^3$ |
| Annual average ($PM_{10}$ only) | 1.0 $\mu g/m^3$ |

Notes:

[a] The $NO_2$, $SO_2$, and CO thresholds are absolute thresholds; the maximum predicted Project impact is added to the background concentration and compared to the threshold.

[b] This analysis included the use of both the current SCAQMD $NO_2$ threshold (0.18 ppm), which is the state standard, and the newer federal 1-hour ambient air quality standard (0.100 ppm). To attain the federal standard, the 3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour averages at a receptor must not exceed 0.100 ppm.

[c] For the purpose of determining significance, the more stringent annual state $NO_2$ standard of 57 $\mu g/m^3$ was used in instead of the higher annual federal standard.

[d] To attain the $SO_2$ federal 1-hour standard, the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour averages at a receptor must not exceed 0.075 ppm. This analysis conservatively used the highest modeled 1-hour $SO_2$ concentration.

[e] The $PM_{10}$ and $PM_{2.5}$ thresholds are incremental thresholds; the maximum Project impact relative to the 2008 Actual Baseline is compared to these thresholds without adding a background concentration.

Sources:

SCAQMD 2015; USEPA 2017b.

**Table B2-4. Background Concentrations Measured at the Wilmington Community Station for Analysis Year 2012**

| Pollutant | Averaging Period | Monitored Concentration (ppm) [a,f] | | | Background Concentration [d] | |
|---|---|---|---|---|---|---|
| | | 2010 | 2011 | 2012 | (ppm) | (µg/m³) [e] |
| $NO_2$ | State 1-Hour | 0.098 | 0.091 | 0.078 | 0.098 | 185 |
| | Federal 1-Hour [b] | 0.079 | 0.080 | 0.062 | 0.074 | 139 |
| | Annual | 0.021 | 0.021 | 0.016 | 0.021 | 40 |
| CO | 1-Hour | 4.6 | 5.0 | 4.7 | 5.0 | 5,740 |
| | 8-Hour | 2.7 | 3.0 | 2.5 | 3.0 | 3,444 |
| $SO_2$ | State 1-Hour | 0.046 | 0.029 | 0.028 | 0.046 | 121 |
| | Federal 1-Hour [c] | 0.030 | 0.024 | 0.016 | 0.023 | 61 |
| | 24-Hour | 0.009 | 0.009 | 0.006 | 0.009 | 24 |

Notes:

a. All reported values represent the highest observed concentration during the year unless otherwise noted.

b. The federal 1-hour $NO_2$ concentration for each year represents the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations.

c. The federal 1-hour $SO_2$ concentration for each year represents the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations.

d. The background concentrations for federal 1-hour $NO_2$ and $SO_2$ are averages of the three reported years. The background concentrations for all other pollutants and averaging periods are maximums of the three reported years.

e. The concentration in micrograms per cubic meter (µg/m³) is calculated as follows: µg/m³ = ppm x MW / 0.0244. The molecular weights (MW) are 28.01 for CO, 46.0055 for $NO_2$, and 64.066 for $SO_2$.

f. Source: POLA, 2018. The years reported in this table represent the following 12-month observation periods: Year 2010 represents May 2010 - April 2011, Year 2011 represents May 2011 - April 2012, and Year 2012 represents May 2012 - April 2013.

**Table B2-5. Background Concentrations Measured at the Wilmington Community Station for Analysis Year 2014**

| Pollutant | Averaging Period | Monitored Concentration (ppm) [a,f] | | | Background Concentration [d] | |
|---|---|---|---|---|---|---|
| | | 2012 | 2013 | 2014 | (ppm) | (µg/m³) [e] |
| $NO_2$ | State 1-Hour | 0.078 | 0.092 | 0.085 | 0.092 | 173 |
| | Federal 1-Hour [b] | 0.062 | 0.074 | 0.066 | 0.067 | 127 |
| | Annual | 0.016 | 0.018 | 0.017 | 0.018 | 34 |
| CO | 1-Hour | 4.7 | 4.0 | 3.8 | 4.7 | 5,395 |
| | 8-Hour | 2.5 | 2.9 | 2.5 | 2.9 | 3,329 |
| $SO_2$ | State 1-Hour | 0.028 | 0.050 | 0.027 | 0.050 | 131 |
| | Federal 1-Hour [c] | 0.016 | 0.015 | 0.018 | 0.016 | 43 |
| | 24-Hour | 0.006 | 0.006 | 0.005 | 0.006 | 16 |

Notes:

a. All reported values represent the highest observed concentration during the year unless otherwise noted.

b. The federal 1-hour $NO_2$ concentration for each year represents the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations.

c. The federal 1-hour $SO_2$ concentration for each year represents the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations.

d. The background concentrations for federal 1-hour $NO_2$ and $SO_2$ are averages of the three reported years. The background concentrations for all other pollutants and averaging periods are maximums of the three reported years.

e. The concentration in micrograms per cubic meter (µg/m$^3$) is calculated as follows: µg/m$^3$ = ppm x MW / 0.0244. The molecular weights (MW) are 28.01 for CO, 46.0055 for $NO_2$, and 64.066 for $SO_2$.

f. Source: POLA, 2018. The years reported in this table represent the following 12-month observation periods: Year 2012 represents May 2012 - April 2013, Year 2013 represents May 2013 - April 2014, and Year 2014 represents May 2014 - April 2015.

### Table B2-6. Background Concentrations Measured at the Wilmington Community Station for Analysis Years 2018-2045

| Pollutant | Averaging Period | Monitored Concentration (ppm) [a,f] | | | Background Concentration [d] | |
|---|---|---|---|---|---|---|
| | | 2015 | 2016 | 2017 | (ppm) | (µg/m$^3$) [e] |
| $NO_2$ | State 1-Hour | 0.086 | 0.087 | 0.076 | 0.087 | 164 |
| | Federal 1-Hour [b] | 0.064 | 0.066 | 0.066 | 0.065 | 123 |
| | Annual | 0.017 | 0.015 | 0.013 | 0.017 | 32 |
| CO | 1-Hour | 3.9 | 3.4 | 3.8 | 3.9 | 4,477 |
| | 8-Hour | 2.4 | 2.2 | 2.3 | 2.4 | 2,755 |
| $SO_2$ | State 1-Hour | 0.04 | 0.038 | 0.052 | 0.052 | 137 |
| | Federal 1-Hour [c] | 0.018 | 0.016 | 0.019 | 0.018 | 46 |
| | 24-Hour | 0.005 | 0.004 | 0.009 | 0.009 | 24 |

Notes:

a. All reported values represent the highest observed concentration during the year unless otherwise noted.

b. The federal 1-hour $NO_2$ concentration for each year represents the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations.

c. The federal 1-hour $SO_2$ concentration for each year represents the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations.

d. The background concentrations for federal 1-hour $NO_2$ and $SO_2$ are averages of the three reported years. The background concentrations for all other pollutants and averaging periods are maximums of the three reported years.

e. The concentration in micrograms per cubic meter (µg/m$^3$) is calculated as follows: µg/m$^3$ = ppm x MW / 0.0244. The molecular weights (MW) are 28.01 for CO, 46.0055 for $NO_2$, and 64.066 for $SO_2$.

f. Source: POLA, 2018. The years reported in this table represent the following 12-month observation periods: Year 2015 represents May 2015 - April 2016, Year 2016 represents May 2016 - April 2017, and Year 2017 represents May 2017 - April 2018.

# 3.3 Predicted Air Quality Impacts

## 3.3.1 Revised Project

Table B2-7 presents the maximum off-site $NO_2$ concentration impacts associated with the Revised Project in each analysis year. Results show that impacts would exceed the federal 1-hour $NO_2$ significance threshold in 2014 and 2018, the state 1-hour $NO_2$ threshold in 2014, and the annual $NO_2$ threshold in 2014 and 2018.

Table B2-8 presents the maximum off-site $SO_2$ and CO concentration impacts associated with the Revised Project. Because prior Port projects have shown that $SO_2$ and CO are unlikely to exceed the significance thresholds, a conservative screening approach was used for $SO_2$ and CO where each AERMOD source was modeled with its maximum emissions over all analysis years. The screening results show that impacts would be below the $SO_2$ and CO significance thresholds in all analysis years.

Table B2-9 presents the maximum off-site $PM_{10}$ and $PM_{2.5}$ concentration increments associated with the Revised Project in each analysis year. Results show that impacts would exceed the 24-hour and annual $PM_{10}$ significance thresholds in 2014, 2018, 2023, 2030, 2036, and 2045. Impacts would be below the $PM_{2.5}$ significance thresholds in all analysis years.

### Table B2-7. Maximum Off-Site Ambient $NO_2$ Concentrations Associated with the Revised Project

| Pollutant | Averaging Period | Analysis Year | Background Concentration (µg/m$^3$)[c] | Maximum Modeled Project Concentration Increment (µg/m$^3$)[d,~~f~~] | Total Concentration (µg/m$^3$)[a,e] | Significance Threshold (µg/m$^3$) | Threshold Exceeded? |
|---|---|---|---|---|---|---|---|
| $NO_2$[b] | Federal 1-hour | 2012 | 139 | 40.3 | 179 | 188 | No |
| | | 2014 | 127 | 158.9 | **286** | 188 | **Yes** |
| | | 2018 | 123 | 108.7 | **232** | 188 | **Yes** |
| | | 2023 | 123 | 17.8~~15.6~~ | 141~~139~~ | 188 | No |
| | | 2030 | 123 | 11.6 | 135 | 188 | No |
| | | 2036 | 123 | 4.3 | 127 | 188 | No |
| | | 2045 | 123 | 0.7~~< 0~~ | 124~~123~~ | 188 | No |
| | State 1-hour | 2012 | 185 | 44.4 | 229 | 339 | No |
| | | 2014 | 173 | 169.6 | **343** | 339 | **Yes** |
| | | 2018 | 164 | 119.2 | 283 | 339 | No |
| | | 2023 | 164 | 19.9 | 184 | 339 | No |
| | | 2030 | 164 | 13.0 | 177 | 339 | No |
| | | 2036 | 164 | 5.1 | 169 | 339 | No |
| | | 2045 | 164 | 2.1~~1.2~~ | 166~~165~~ | 339 | No |
| | Annual | 2012 | 40 | 11.6 | 52 | 57 | No |
| | | 2014 | 34 | 31.7 | **66** | 57 | **Yes** |
| | | 2018 | 32 | 25.2 | **57** | 57 | **Yes** |
| | | 2023 | 32 | 8.7 | 41 | 57 | No |
| | | 2030 | 32 | 1.6 | 34 | 57 | No |
| | | 2036 | 32 | 0.6 | 33 | 57 | No |
| | | 2045 | 32 | 0.7 | 33 | 57 | No |

[a] Exceedances of the thresholds are indicated in bold.
[b] The federal 1-hour $NO_2$ modeled concentration represents the 98th percentile of the daily maximum 1-hour average concentrations. The state 1-hour $NO_2$ modeled concentration represents the maximum concentration.
[c] The background concentrations were obtained from the Wilmington Community Monitoring Station (Saints Peter and Paul School).
[d] The Modeled Project Concentration Increment represents the modeled concentration of the Project minus the modeled concentration of the 2008 Actual Baseline.
[e] The Total Concentration equals the Background Concentration plus the Maximum Modeled Project Concentration Increment.
~~[f] A Maximum Modeled Project Concentration Increment less than zero means that the Project concentration would be less than the 2008 Actual Baseline concentration at every modeled receptor.~~

### Table B2-8. Maximum Off-Site Ambient SO2 and CO Concentrations Associated with the Revised Project

| Pollutant | Averaging Period | Background Concentration (µg/m$^3$)[b] | Maximum Modeled Project Concentration Increment (µg/m$^3$)[c,e] | Total Concentration (µg/m$^3$)[a,d] | Significance Threshold (µg/m$^3$) | Threshold Exceeded? |
|---|---|---|---|---|---|---|
| $SO_2$ | Federal 1-hour | 61 | < 0 | 61 | 196 | No |
| | State 1-hour | 137 | < 0 | 137 | 655 | No |
| | 24-hour | 24 | < 0 | 24 | 105 | No |
| CO | 1-hour | 5,740 | 2,216 | 7,956 | 23,000 | No |
| | 8-hour | 3,444 | 1,554 | 4,998 | 10,000 | No |

[a] Exceedances of the thresholds are indicated in bold.
[b] The background concentrations were obtained from the Wilmington Community Monitoring Station (Saints Peter and Paul School).
[c] The Modeled Project Concentration Increment represents the modeled concentration of the Project minus the modeled concentration of the 2008 Actual Baseline.
[d] The Total Concentration equals the Background Concentration plus the Maximum Modeled Project Concentration Increment.
[e] A Maximum Modeled Project Concentration Increment less than zero means that the Project concentration would be less than the 2008 Actual Baseline concentration at every modeled receptor.

**Table B2-9. Maximum Off-Site Ambient $PM_{10}$ and $PM_{2.5}$ Concentration Increments Associated with the Revised Project**

| Pollutant | Averaging Period | Analysis Year | Maximum Modeled Project Concentration Increment (μg/m³)[a,b,c,d] | Significance Threshold (μg/m³) | Threshold Exceeded? |
|---|---|---|---|---|---|
| $PM_{10}$ | 24-hour | 2012 | 1.9 | 2.5 | No |
| | | 2014 | **5.9** | 2.5 | **Yes** |
| | | 2018 | **4.7** | 2.5 | **Yes** |
| | | 2023 | **4.9** | 2.5 | **Yes** |
| | | 2030 | **3.8** | 2.5 | **Yes** |
| | | 2036 | **3.9** | 2.5 | **Yes** |
| | | 2045 | **3.9** | 2.5 | **Yes** |
| | Annual | 2012 | 0.7 | 1.0 | No |
| | | 2014 | **1.9** | 1.0 | **Yes** |
| | | 2018 | **1.5** | 1.0 | **Yes** |
| | | 2023 | **1.7** | 1.0 | **Yes** |
| | | 2030 | **1.4** | 1.0 | **Yes** |
| | | 2036 | **1.4** | 1.0 | **Yes** |
| | | 2045 | **1.4** | 1.0 | **Yes** |
| $PM_{2.5}$ | 24-hour | 2012 | 1.2 | 2.5 | No |
| | | 2014 | 2.2 | 2.5 | No |
| | | 2018 | 1.2 | 2.5 | No |
| | | 2023 | 0.3 | 2.5 | No |
| | | 2030 | < 0 | 2.5 | No |
| | | 2036 | < 0 | 2.5 | No |
| | | 2045 | < 0 | 2.5 | No |

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

[b] The Modeled Project Concentration Increment represents the modeled concentration of the Project minus the modeled concentration of the 2008 Actual Baseline.

[c] A Maximum Modeled Project Concentration Increment less than zero means that the Project concentration would be less than the 2008 Baseline concentration at every modeled receptor.

[d] Because the thresholds for $PM_{10}$ and $PM_{2.5}$ are incremental thresholds, background concentrations are not added to the Maximum Modeled Project Concentration Increment.

Figures B2-6 and B2-7 show the locations of the maximum modeled concentrations of $NO_2$, CO, $PM_{10}$, and $PM_{2.5}$ associated with the Revised Project. The locations in the figures correspond to the concentrations displayed in Tables B2-7, B2-8, and B2-9. In the figures, only the receptor locations with modeled concentration increments greater than zero are shown because negative increments would approach a maximum value of zero infinitely far away from the Project site.

**Figure B2-6. Locations of Maximum Modeled Pollutant Concentrations Associated with the Revised Project (far field)**

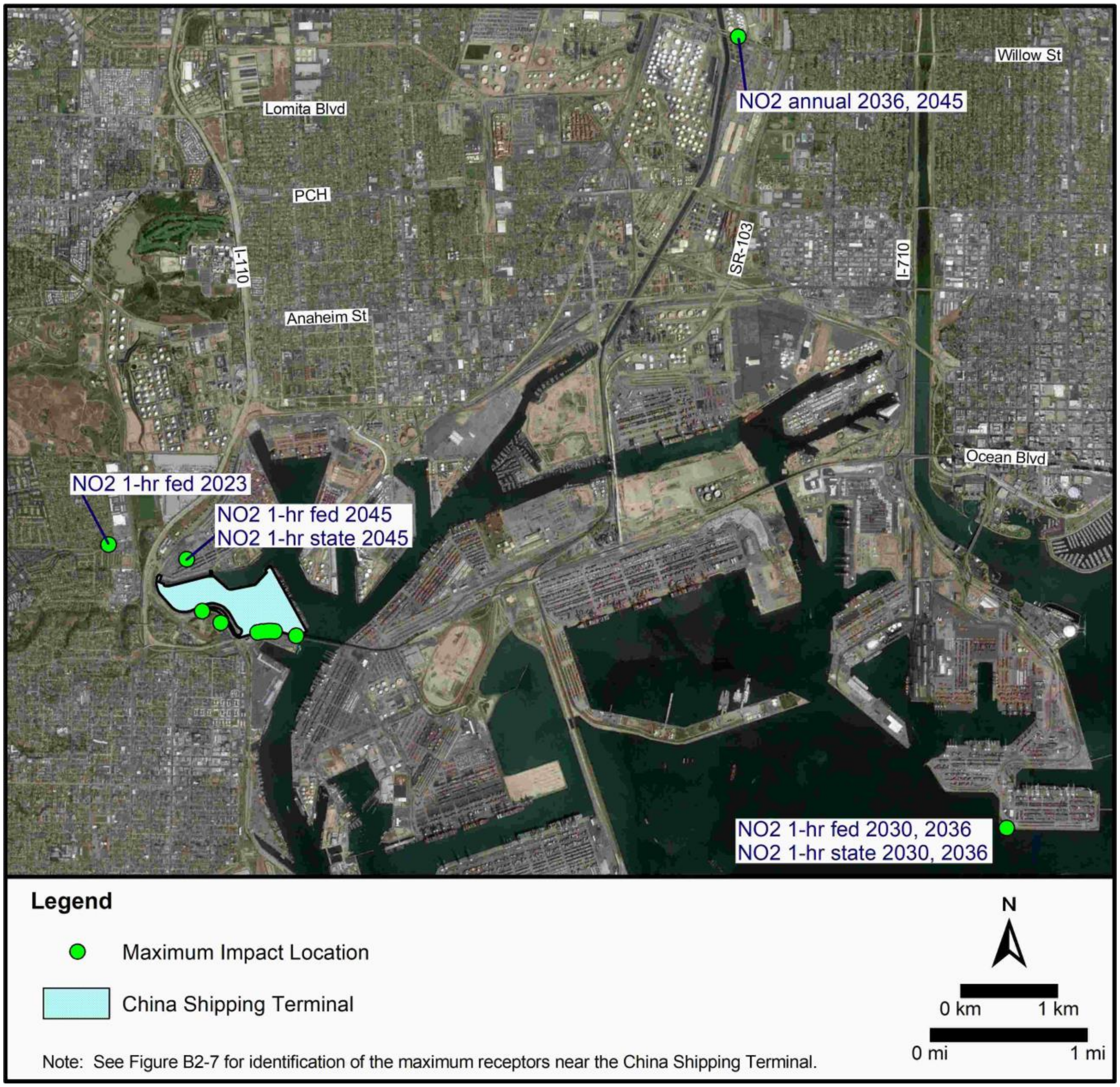
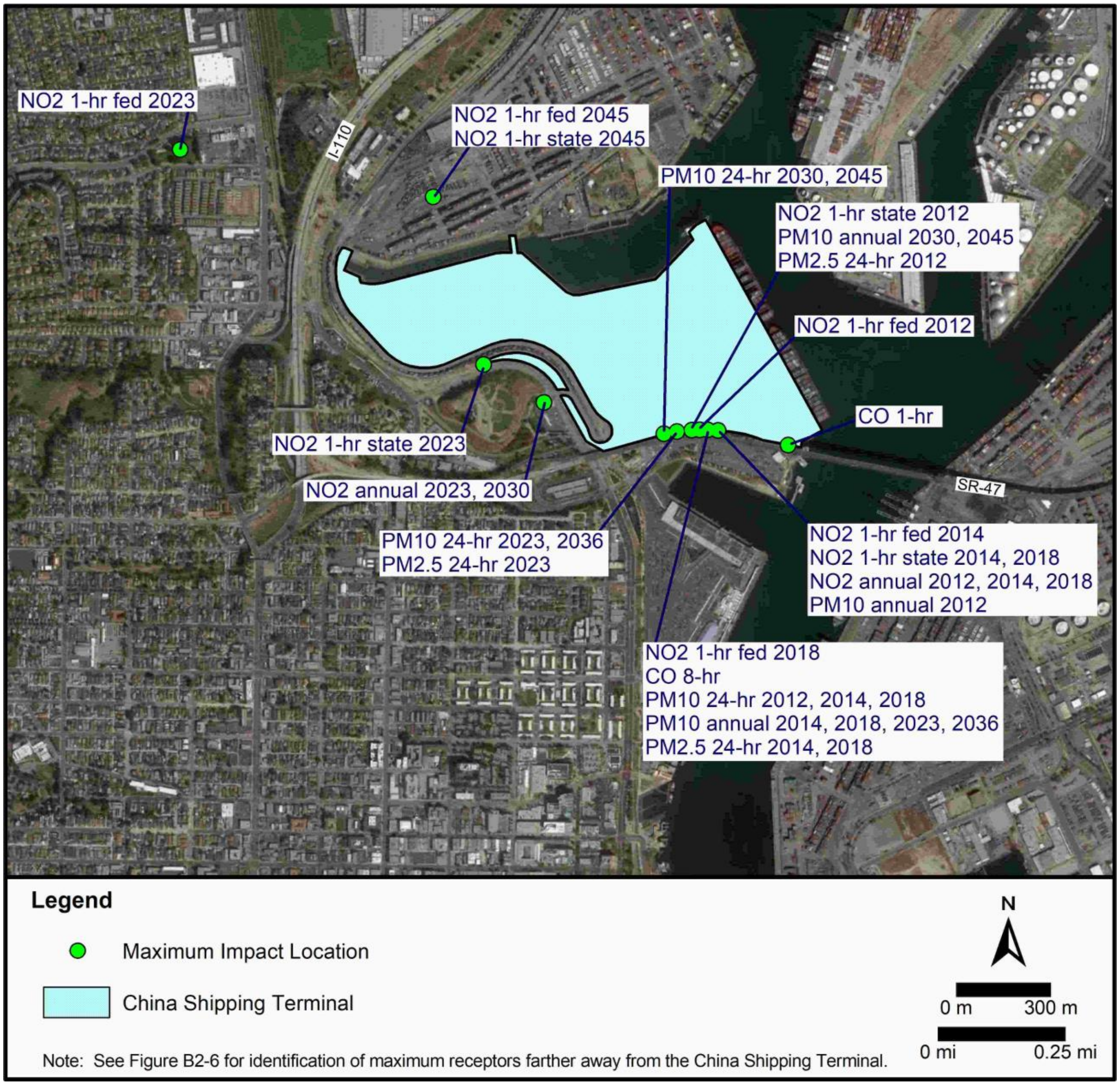


**Figure B2-7. Locations of Maximum Modeled Pollutant Concentrations Associated with the Revised Project (near field)**



Figures B2-8 and B2-9 show the areas where the federal 1-hour $NO_2$ concentrations associated with the Revised Project would exceed the significance threshold in 2014 and 2018, respectively. Figure B2-10 shows the area where the state 1-hour $NO_2$ concentration associated with the Revised Project would exceed the significance threshold in 2014. Figures B2-11 and B2-12 show the areas where the annual $NO_2$ concentrations associated with the Revised Project would exceed the significance threshold in 2014 and 2018, respectively. None of the exceedance areas would extend over existing residences.

Figures B2-13, B2-14, B2-15, B2-16, B2-17, and B2-18 show the areas where the 24-hour $PM_{10}$ concentration increments associated with the Revised Project would exceed the significance threshold in 2014, 2018, 2023, 2030, 2036, and 2045, respectively. Figures B2-19, B2-20, B2-21, B2-22, B2-23, and B2-24 show the areas where the annual $PM_{10}$ concentration increments associated with the Revised Project would exceed the significance threshold in 2014, 2018, 2023, 2030, 2036, and 2045, respectively. None of the exceedance areas would extend over existing residences.

**Figure B2-8. Area of Threshold Exceedance for the Revised Project; 2014 Federal 1-Hour $NO_2$ Concentrations**

**Figure B2-9. Area of Threshold Exceedance for the Revised Project; 2018 Federal 1-Hour $NO_2$ Concentrations**

**Figure B2-10. Area of Threshold Exceedance for the Revised Project; 2014 State 1-Hour $NO_2$ Concentrations**

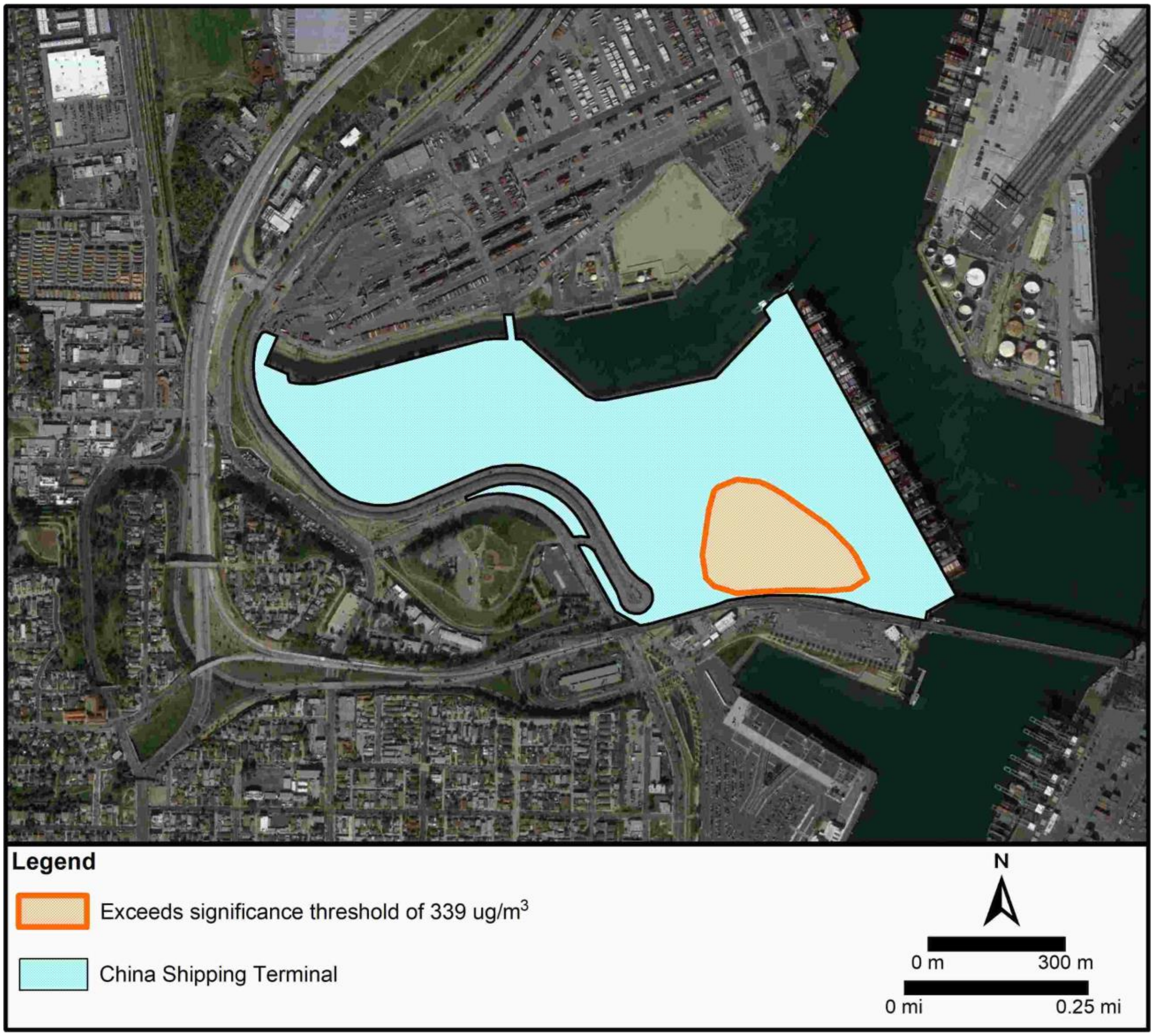


**Figure B2-11. Area of Threshold Exceedance for the Revised Project; 2014 Annual $NO_2$ Concentrations**

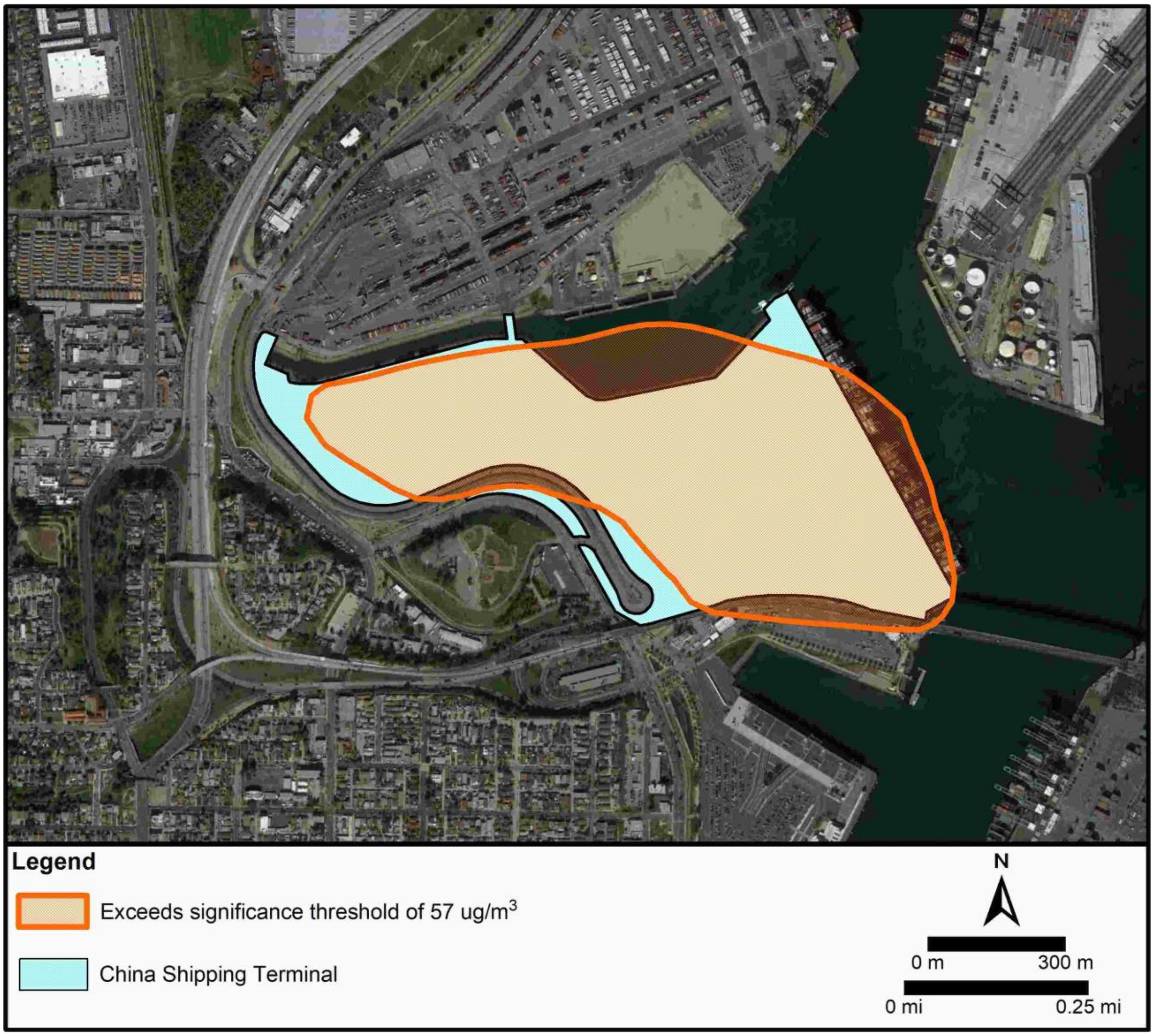


**Figure B2-12. Area of Threshold Exceedance for the Revised Project; 2018 Annual $NO_2$ Concentrations**

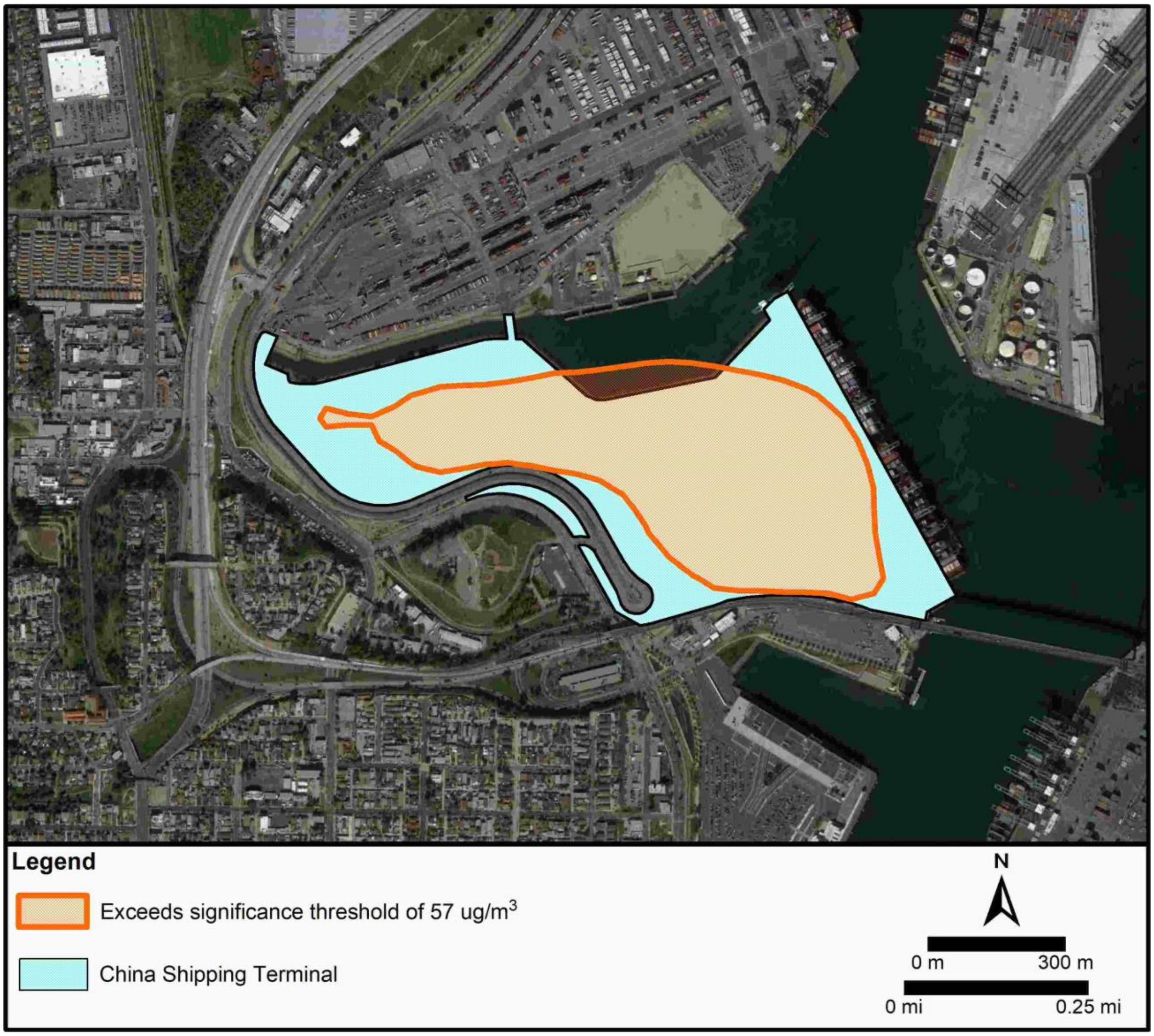


**Figure B2-13. Area of Threshold Exceedance for the Revised Project; 2014 24-Hour $PM_{10}$ Concentration Increments**

**Figure B2-14. Area of Threshold Exceedance for the Revised Project; 2018 24-Hour $PM_{10}$ Concentration Increments**

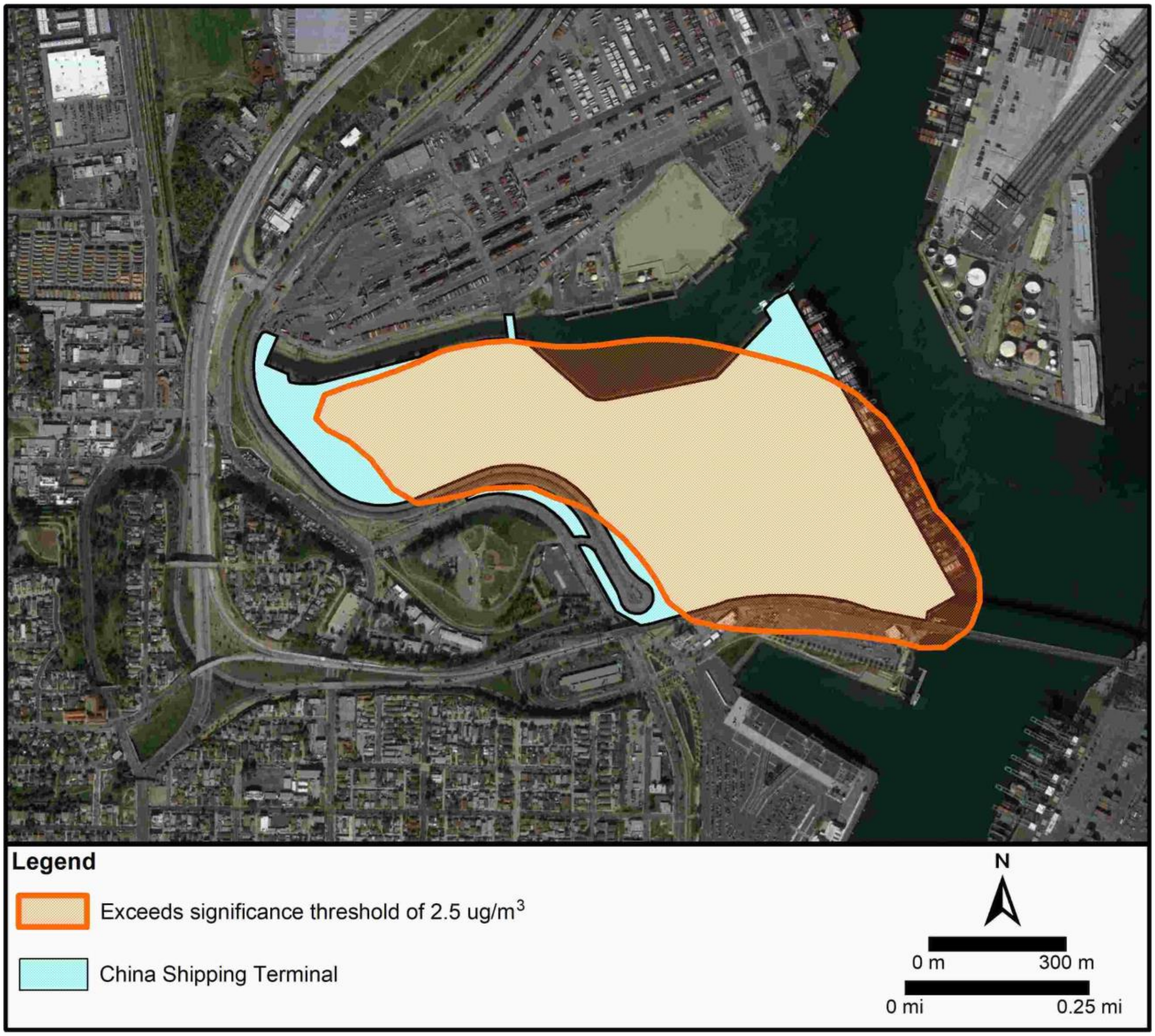


**Figure B2-15. Area of Threshold Exceedance for the Revised Project; 2023 24-Hour $PM_{10}$ Concentration Increments**

**Figure B2-16. Area of Threshold Exceedance for the Revised Project; 2030 24-Hour $PM_{10}$ Concentration Increments**

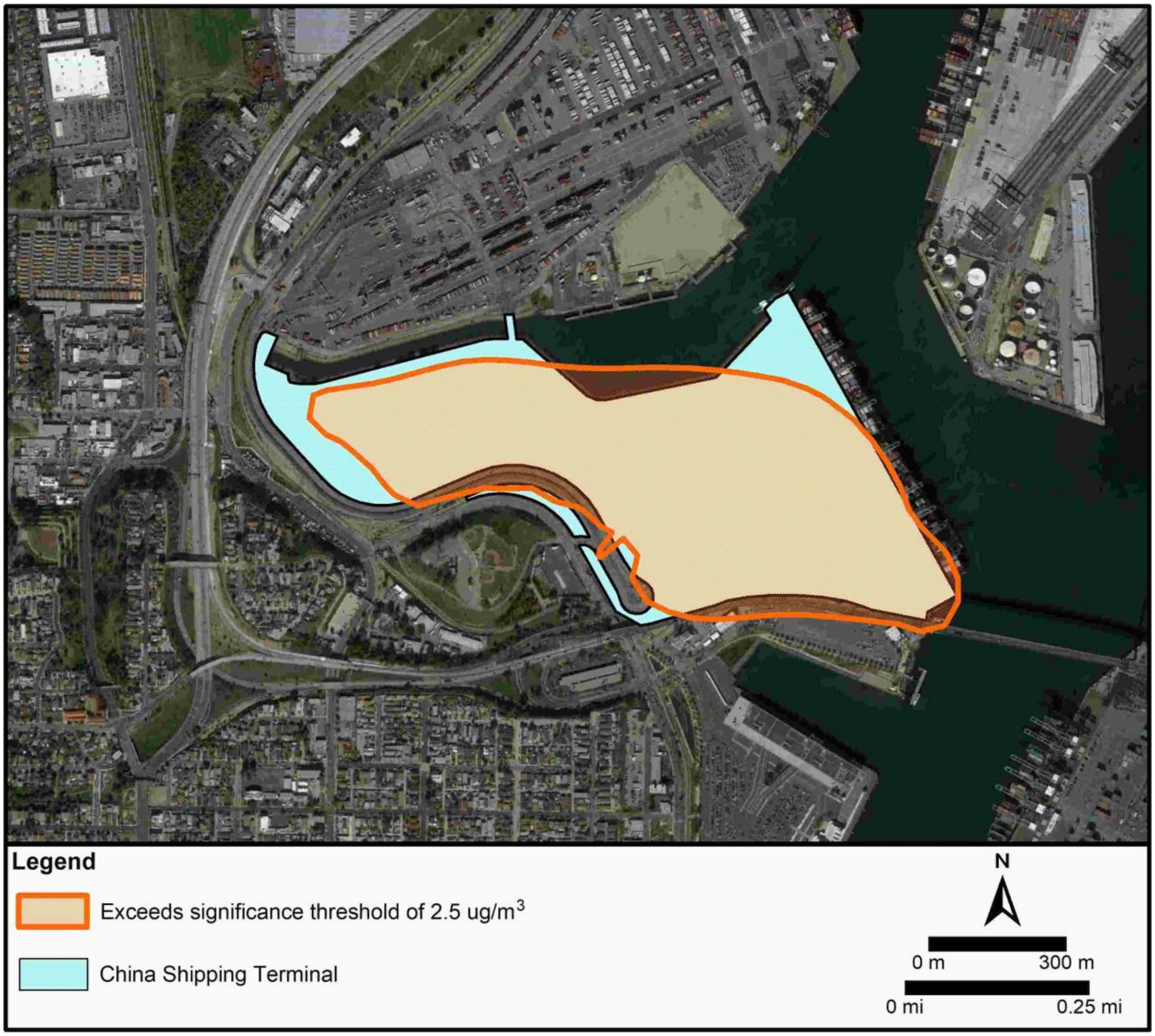


**Figure B2-17. Area of Threshold Exceedance for the Revised Project; 2036 24-Hour $PM_{10}$ Concentration Increments**

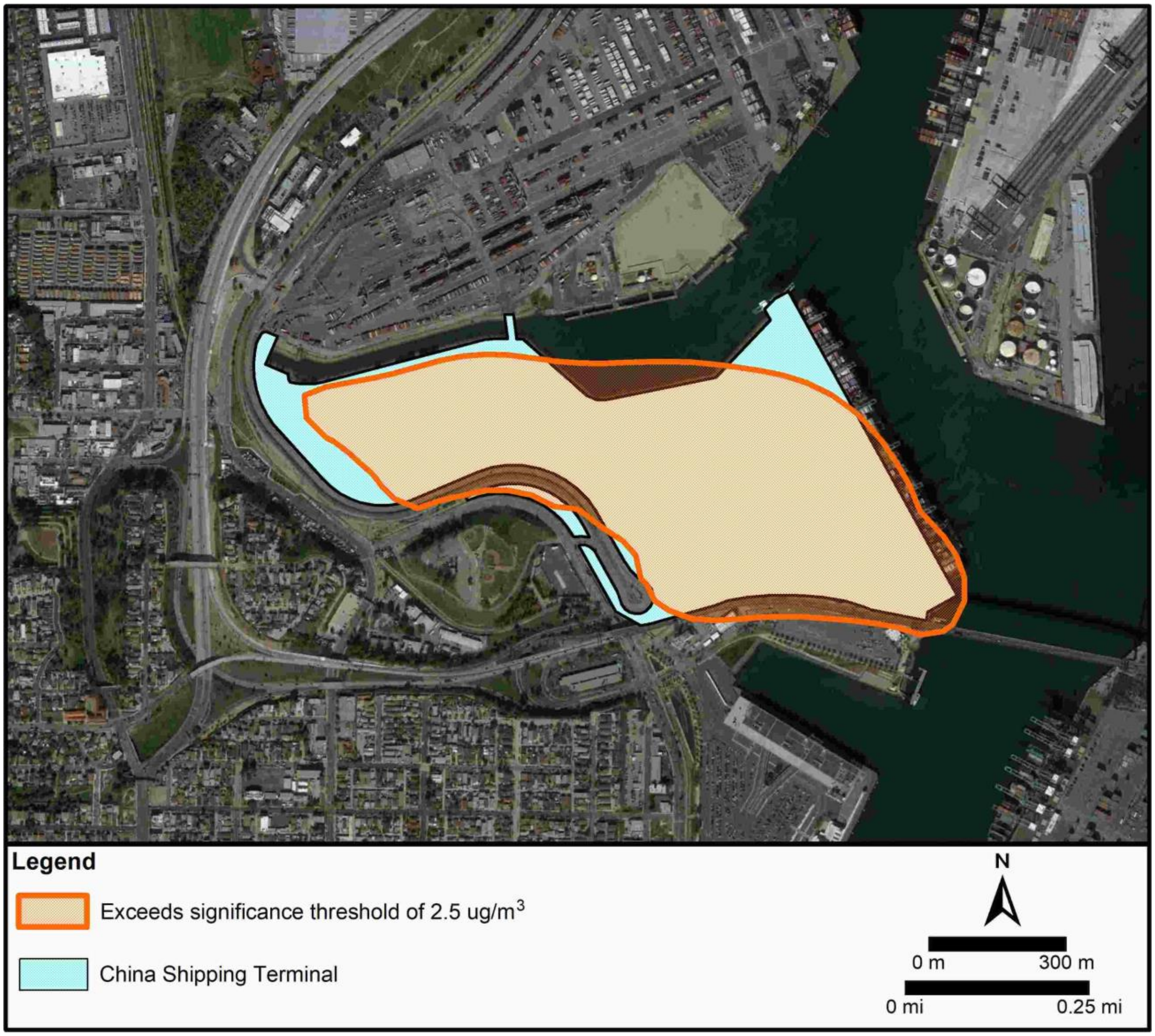


**Figure B2-18. Area of Threshold Exceedance for the Revised Project; 2045 24-Hour $PM_{10}$ Concentration Increments**

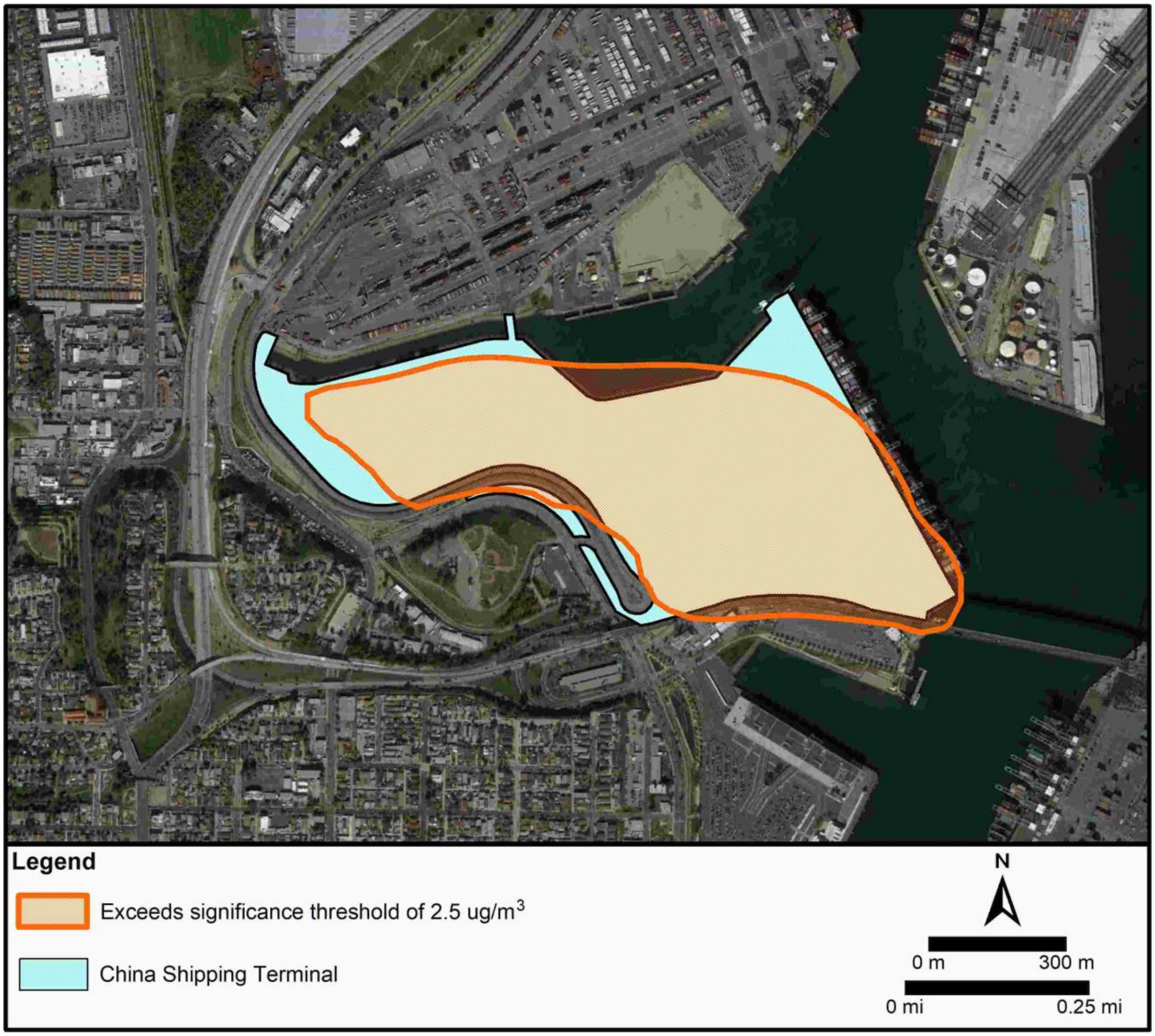


**Figure B2-19. Area of Threshold Exceedance for the Revised Project; 2014 Annual $PM_{10}$ Concentration Increments**

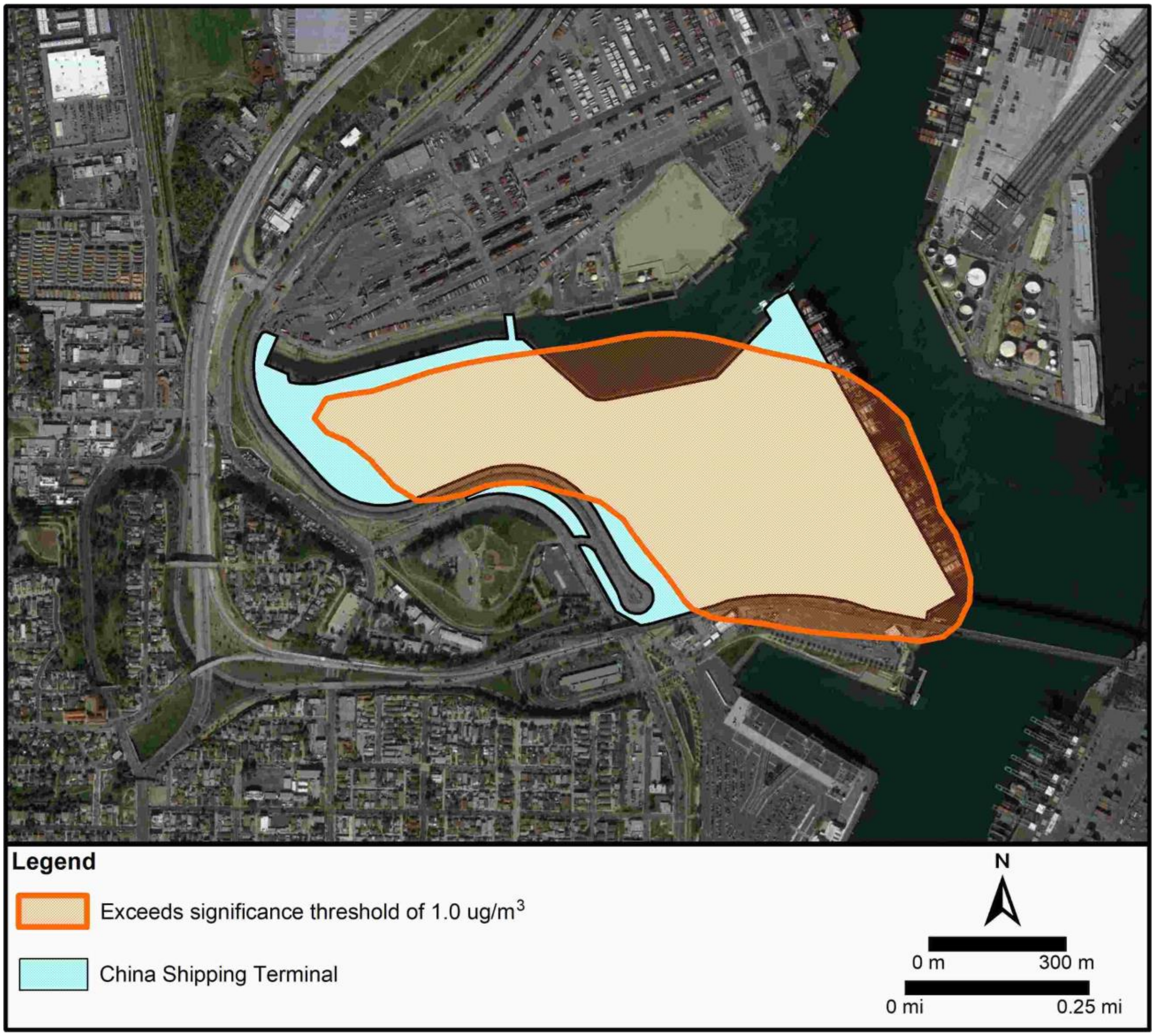


**Figure B2-20. Area of Threshold Exceedance for the Revised Project; 2018 Annual $PM_{10}$ Concentration Increments**

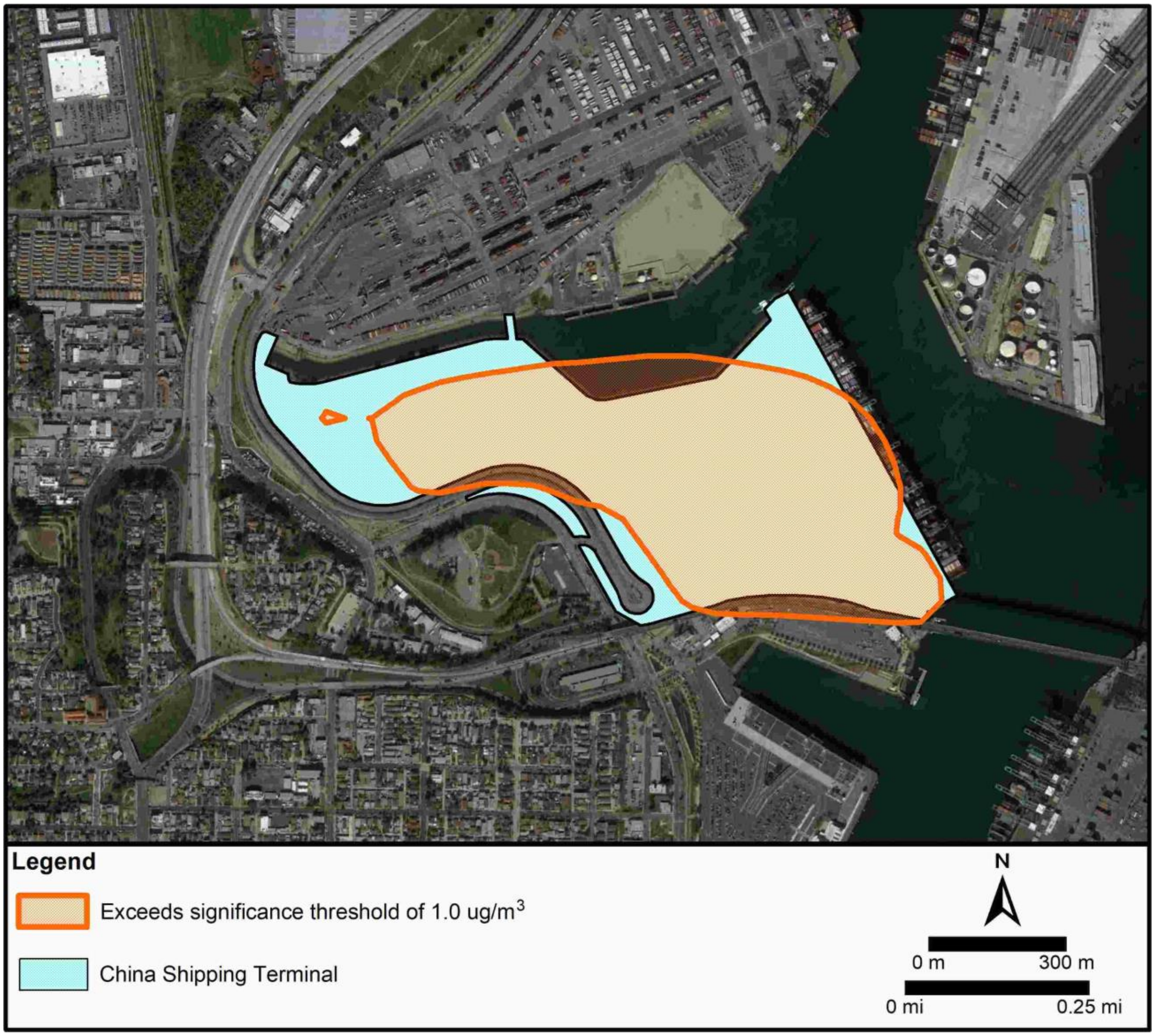


**Figure B2-21. Area of Threshold Exceedance for the Revised Project; 2023 Annual $PM_{10}$ Concentration Increments**

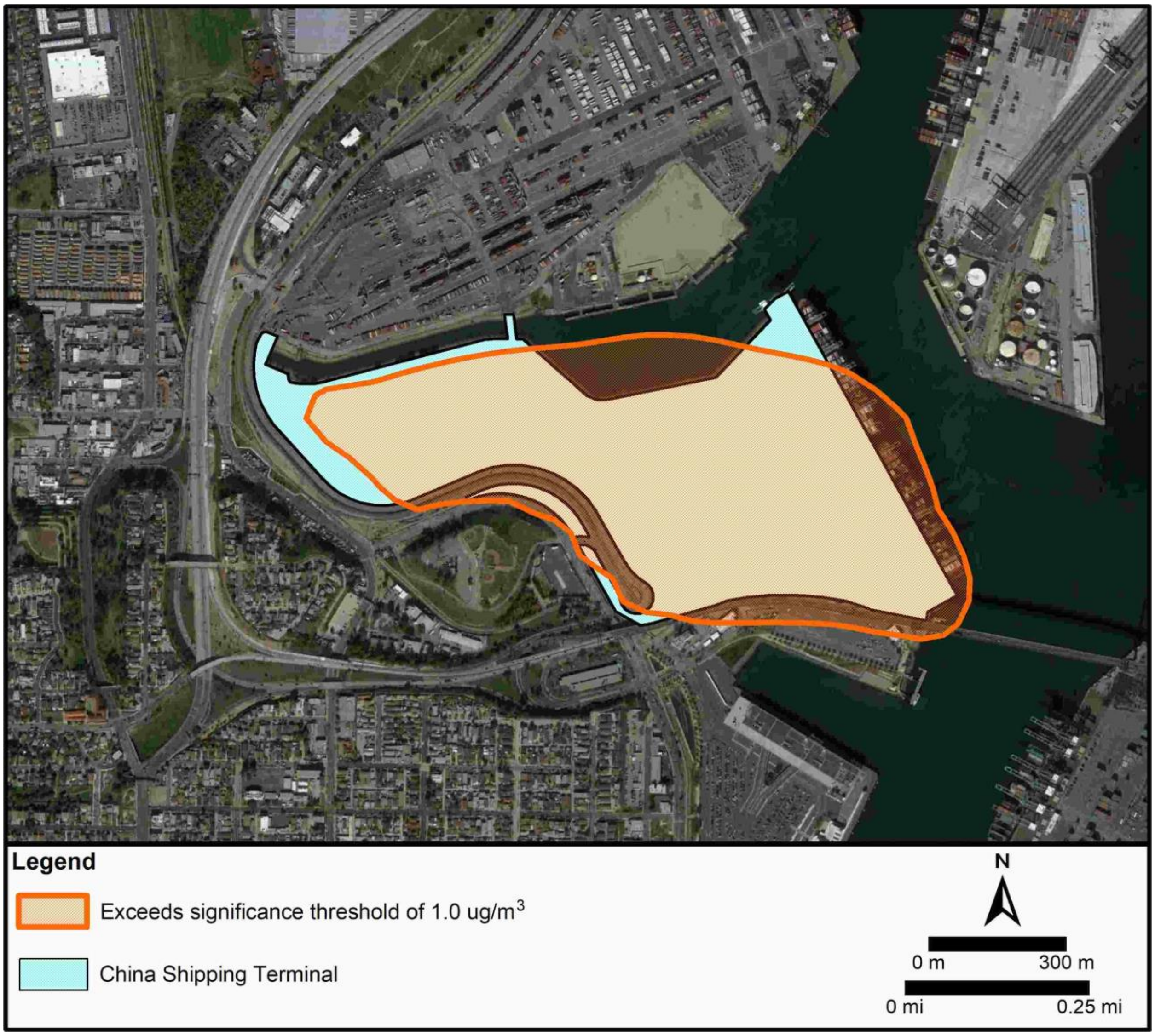


**Figure B2-22. Area of Threshold Exceedance for the Revised Project; 2030 Annual $PM_{10}$ Concentration Increments**

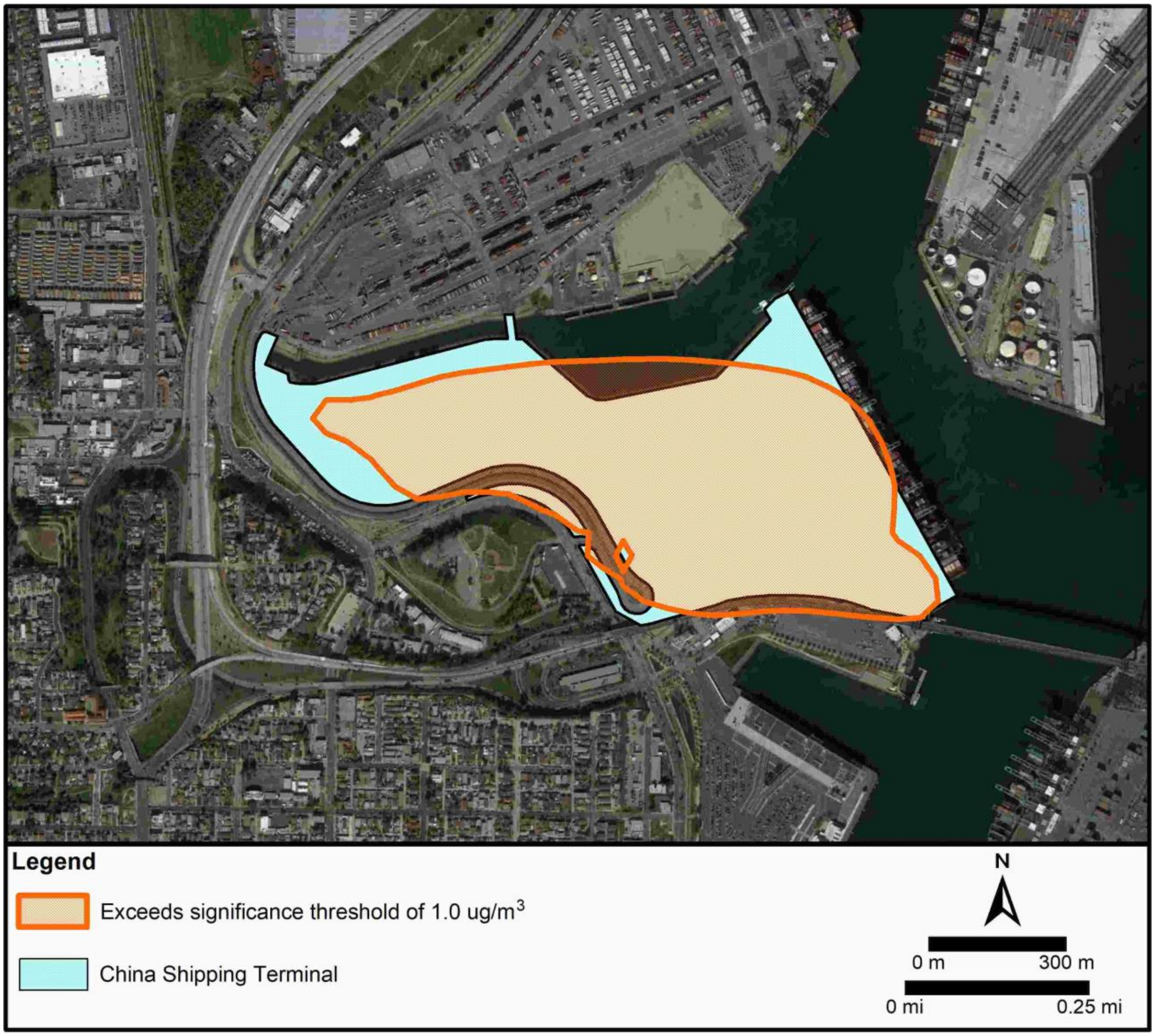


**Figure B2-23. Area of Threshold Exceedance for the Revised Project; 2036 Annual $PM_{10}$ Concentration Increments**

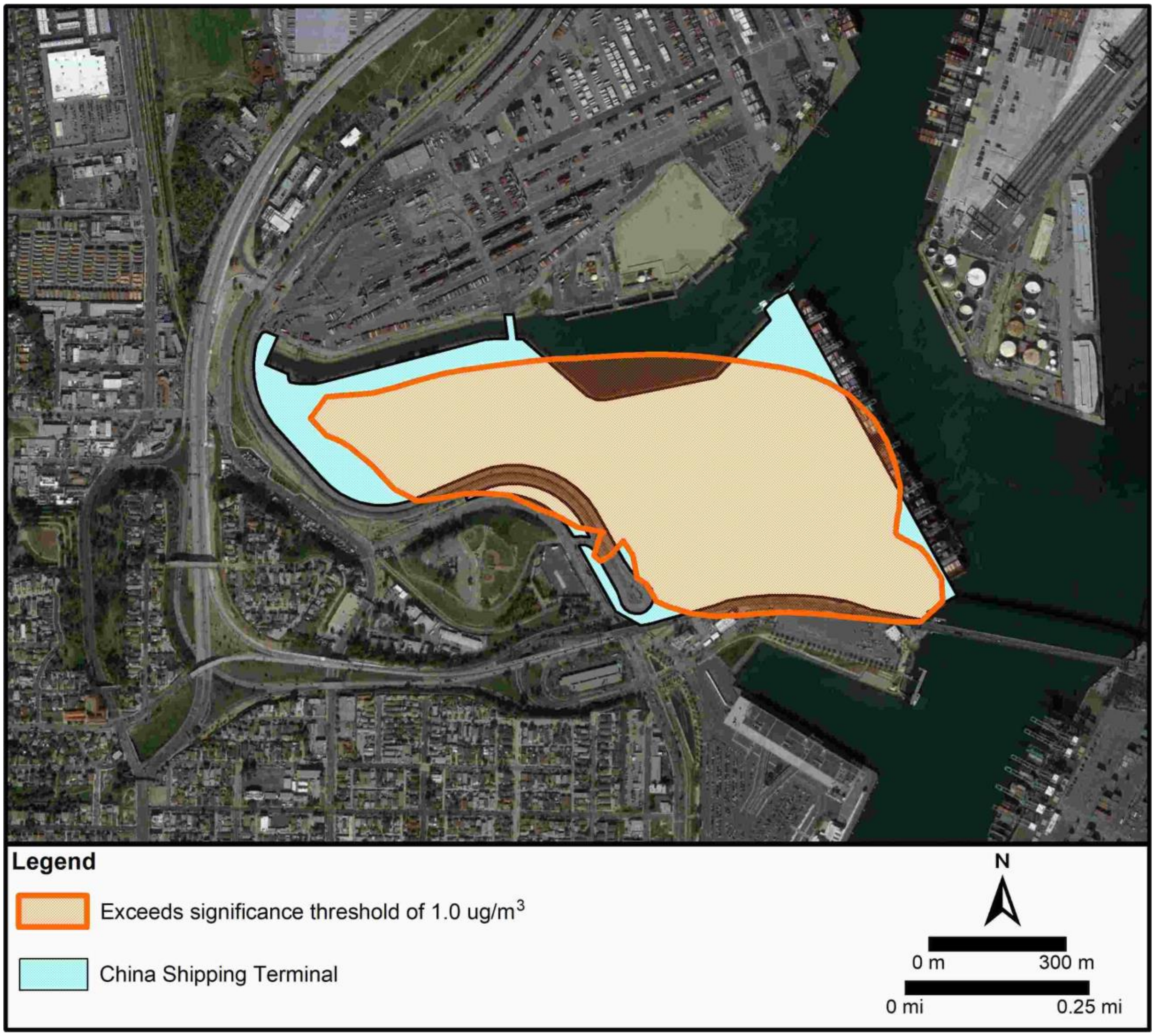


**Figure B2-24. Area of Threshold Exceedance for the Revised Project; 2045 Annual $PM_{10}$ Concentration Increments**

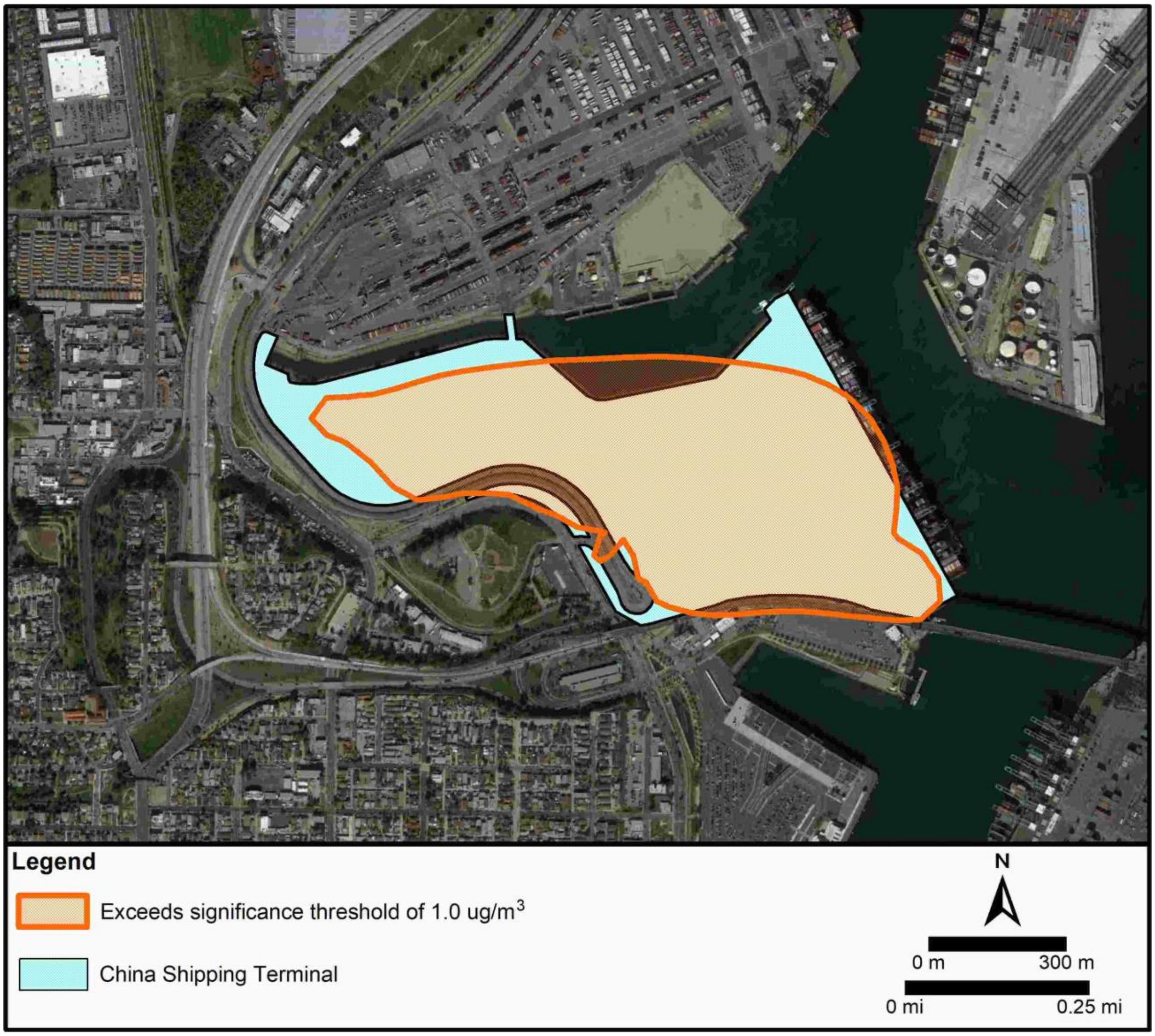



Table B2-10 presents the contributions by source type to the maximum off-site pollutant concentrations associated with the Revised Project. The table presents contributions in the analysis year with the greatest predicted impact for those pollutants and averaging times that would exceed a significance threshold. In the case of the Revised Project, all presented impacts (federal 1-hour, state 1-hour, and annual $NO_2$; and 24-hour and annual $PM_{10}$) would occur in analysis year 2014 along the southern boundary of the China Shipping terminal. The table shows that, at this location adjacent to the terminal, cargo handling equipment and on-site trucks are the primary contributors.

**Table B2-10. Source Contributions to Maximum Off-Site Pollutant Concentrations Associated with the Revised Project**

| Source Category | Contribution at Maximum Off-Site Receptor [a] | | | | |
|---|---|---|---|---|---|
| | Federal 1-Hour $NO_2$ | State 1-Hour $NO_2$ | Annual $NO_2$ | 24-Hour $PM_{10}$ | Annual $PM_{10}$ |
| Ships in Transit | 17.6% | 17.8% | 0.1% | 0.1% | 0.0% |
| Ships at Berth | 2.1% | 2.7% | 0.2% | 0.6% | 0.2% |
| Ships at Anchorage | 2.4% | 3.0% | 0.1% | 0.3% | 0.0% |
| Tugboats | 2.0% | 2.5% | 0.1% | 0.3% | 0.1% |
| Trucks at Gates and On-Terminal | 13.4% | 13.7% | 12.6% | 55.6% | 57.1% |
| Trucks Driving Off-Terminal | 0.8% | 0.8% | 0.4% | 0.6% | 0.5% |
| Switch Locomotives | 0.2% | 0.2% | 0.1% | 0.0% | 0.0% |
| Line Haul Locomotives | 0.8% | 0.8% | 0.1% | 0.3% | 0.2% |
| Cargo Handling Equipment | 84.8% | 87.7% | 86.3% | 43.1% | 41.6% |
| Worker Vehicles | 0.0% | 0.0% | 0.0% | 0.5% | 0.3% |

[a] Percentages for 1-Hour and 24-Hour averaging periods add to greater than 100 percent because maximum source contributions do not occur simultaneously.

## 3.3.2 FEIR Mitigated Scenario

Impacts associated with the FEIR Mitigated Scenario are presented for informational purposes to enable a comparison to the Revised Project. Table B2-11 presents the maximum off-site $NO_2$ concentration impacts associated with the FEIR Mitigated Scenario in each analysis year. Results show that impacts would be below the $NO_2$ significance thresholds in all analysis years.

Table B2-12 presents the maximum off-site $SO_2$ and CO concentration impacts associated with the FEIR Mitigated Scenario. Because prior Port projects have shown that $SO_2$ and CO are unlikely to exceed the significance thresholds, a conservative screening approach was used for $SO_2$ and CO where each AERMOD source was modeled with its maximum emissions over all analysis years. The screening results show that impacts would be below the $SO_2$ and CO significance thresholds in all analysis years.

Table B2-13 presents the maximum off-site $PM_{10}$ and $PM_{2.5}$ concentration increments associated with the FEIR Mitigated Scenario in each analysis year. Results show that impacts would exceed the 24-hour and annual $PM_{10}$ significance thresholds in 2014, 2023, 2030, 2036, and 2045. Impacts would be below the $PM_{2.5}$ significance thresholds in all analysis years.

### Table B2-11. Maximum Off-Site Ambient $NO_2$ Concentrations Associated with the FEIR Mitigated Scenario

| Pollutant | Averaging Period | Analysis Year | Background Concentration[c] (µg/m³) | Maximum Modeled Project Concentration Increment (µg/m³)[a,d,~~f~~] | Total Concentration[e] (µg/m³) | Significance Threshold (µg/m³) | Threshold Exceeded? |
|---|---|---|---|---|---|---|---|
| $NO_2$[b] | Federal 1-hour | 2012 | 139 | 9.6 | 149 | 188 | No |
| | | 2014 | 127 | 53.5 | 180 | 188 | No |
| | | 2018 | 123 | 9.1 | 132 | 188 | No |
| | | 2023 | 123 | 11.1 | 134 | 188 | No |
| | | 2030 | 123 | 11.6 | 135 | 188 | No |
| | | 2036 | 123 | 4.3 | 127 | 188 | No |
| | | 2045 | 123 | 0.7~~< 0~~ | 124~~123~~ | 188 | No |
| | State 1-hour | 2012 | 185 | 16.9 | 202 | 339 | No |
| | | 2014 | 173 | 61.7 | 235 | 339 | No |
| | | 2018 | 164 | 10.8 | 175 | 339 | No |
| | | 2023 | 164 | 14.6 | 179 | 339 | No |
| | | 2030 | 164 | 13.0 | 177 | 339 | No |
| | | 2036 | 164 | 5.1 | 169 | 339 | No |
| | | 2045 | 164 | 2.1~~1.3~~ | 166~~165~~ | 339 | No |
| | Annual | 2012 | 40 | 5.2 | 45 | 57 | No |
| | | 2014 | 34 | 16.7 | 51 | 57 | No |
| | | 2018 | 32 | 7.0~~6.4~~ | 39~~38~~ | 57 | No |
| | | 2023 | 32 | 3.3 | 35 | 57 | No |
| | | 2030 | 32 | 2.8 | 35 | 57 | No |
| | | 2036 | 32 | 1.9 | 34 | 57 | No |
| | | 2045 | 32 | 1.8 | 34 | 57 | No |

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

[b] The federal 1-hour $NO_2$ modeled concentration represents the 98th percentile of the daily maximum 1-hour average concentrations. The state 1-hour $NO_2$ modeled concentration represents the maximum concentration.

[c] The background concentrations were obtained from the Wilmington Community Monitoring Station (Saints Peter and Paul School).

[d] The Modeled Project Concentration Increment represents the modeled concentration of the Project minus the modeled concentration of 2008 Actual Baseline.

[e] The Total Concentration equals the Background Concentration plus the Maximum Modeled Project Concentration Increment.

~~[f] A Maximum Modeled Project Concentration Increment less than zero means that the Project concentration would be less than the 2008 Actual Baseline concentration at every modeled receptor.~~

**Table B2-12. Maximum Off-Site Ambient $SO_2$ and CO Concentrations Associated with the FEIR Mitigated Scenario**

| Pollutant | Averaging Period | Background Concentration[b] (µg/m³) | Maximum Modeled Project Concentration Increment (µg/m³)[a,c,e] | Total Concentration[d] (µg/m³) | Significance Threshold (µg/m³) | Threshold Exceeded? |
|---|---|---|---|---|---|---|
| $SO_2$ | Federal 1-hour | 61 | < 0 | 61 | 196 | No |
| | State 1-hour | 137 | < 0 | 137 | 655 | No |
| | 24-hour | 24 | < 0 | 24 | 105 | No |
| CO | 1-hour | 5,740 | 2,245 | 7,985 | 23,000 | No |
| | 8-hour | 3,444 | 1,569 | 5,013 | 10,000 | No |

[a] Exceedances of the thresholds are indicated in bold.
[b] The background concentrations were obtained from the Wilmington Community Monitoring Station (Saints Peter and Paul School).
[c] The Modeled Project Concentration Increment represents the modeled concentration of the Project minus the modeled concentration of the 2008 Actual Baseline.
[d] The Total Concentration equals the Background Concentration plus the Maximum Modeled Project Concentration Increment.
[e] A Maximum Modeled Project Concentration Increment less than zero means that the Project concentration would be less than the 2008 Actual Baseline concentration at every modeled receptor.

**Table B2-13. Maximum Off-Site Ambient $PM_{10}$ and $PM_{2.5}$ Concentration Increments Associated with the FEIR Mitigated Scenario**

| Pollutant | Averaging Period | Analysis Year | Maximum Modeled Project Concentration Increment[a,b,c,d] (µg/m³) | Significance Threshold (µg/m³) | Threshold Exceeded? |
|---|---|---|---|---|---|
| $PM_{10}$ | 24-hour | 2012 | 0.5 | 2.5 | No |
| | | 2014 | **3.7** | 2.5 | **Yes** |
| | | 2018 | 1.8 | 2.5 | No |
| | | 2023 | **3.6** | 2.5 | **Yes** |
| | | 2030 | **4.2** | 2.5 | **Yes** |
| | | 2036 | **4.6** | 2.5 | **Yes** |
| | | 2045 | **4.7** | 2.5 | **Yes** |
| | Annual | 2012 | 0.3 | 1.0 | No |
| | | 2014 | **1.3** | 1.0 | **Yes** |
| | | 2018 | 0.6 | 1.0 | No |
| | | 2023 | **1.3** | 1.0 | **Yes** |
| | | 2030 | **1.5** | 1.0 | **Yes** |
| | | 2036 | **1.6** | 1.0 | **Yes** |
| | | 2045 | **1.7** | 1.0 | **Yes** |
| $PM_{2.5}$ | 24-hour | 2012 | 0.004 | 2.5 | No |
| | | 2014 | 0.2 | 2.5 | No |
| | | 2018 | < 0 | 2.5 | No |
| | | 2023 | < 0 | 2.5 | No |
| | | 2030 | < 0 | 2.5 | No |
| | | 2036 | < 0 | 2.5 | No |
| | | 2045 | < 0 | 2.5 | No |

[a] Exceedances of the thresholds are indicated in bold.
[b] The Modeled Project Concentration Increment represents the modeled concentration of the Project minus the modeled concentration of the 2008 Actual Baseline.
[c] A Maximum Modeled Project Concentration Increment less than zero means that the Project concentration would be less than the 2008 Actual Baseline concentration at every modeled receptor.
[d] Because the thresholds for $PM_{10}$ and $PM_{2.5}$ are incremental thresholds, background concentrations are not added to the Maximum Modeled Project Concentration Increment.

Figures B2-25 and B2-26 show the locations of the maximum modeled concentrations of $NO_2$, CO, $PM_{10}$, and $PM_{2.5}$ associated with the FEIR Mitigated Scenario. The locations in the figures correspond to the concentrations displayed in Tables B2-11, B2-12, and B2-13. In the figures, only the receptor locations with modeled concentration increments greater than zero are shown because negative increments would approach a maximum value of zero infinitely far away from the Project site.

**Figure B2-25. Locations of Maximum Modeled Pollutant Concentrations Associated with the FEIR Mitigated Scenario (far field)**

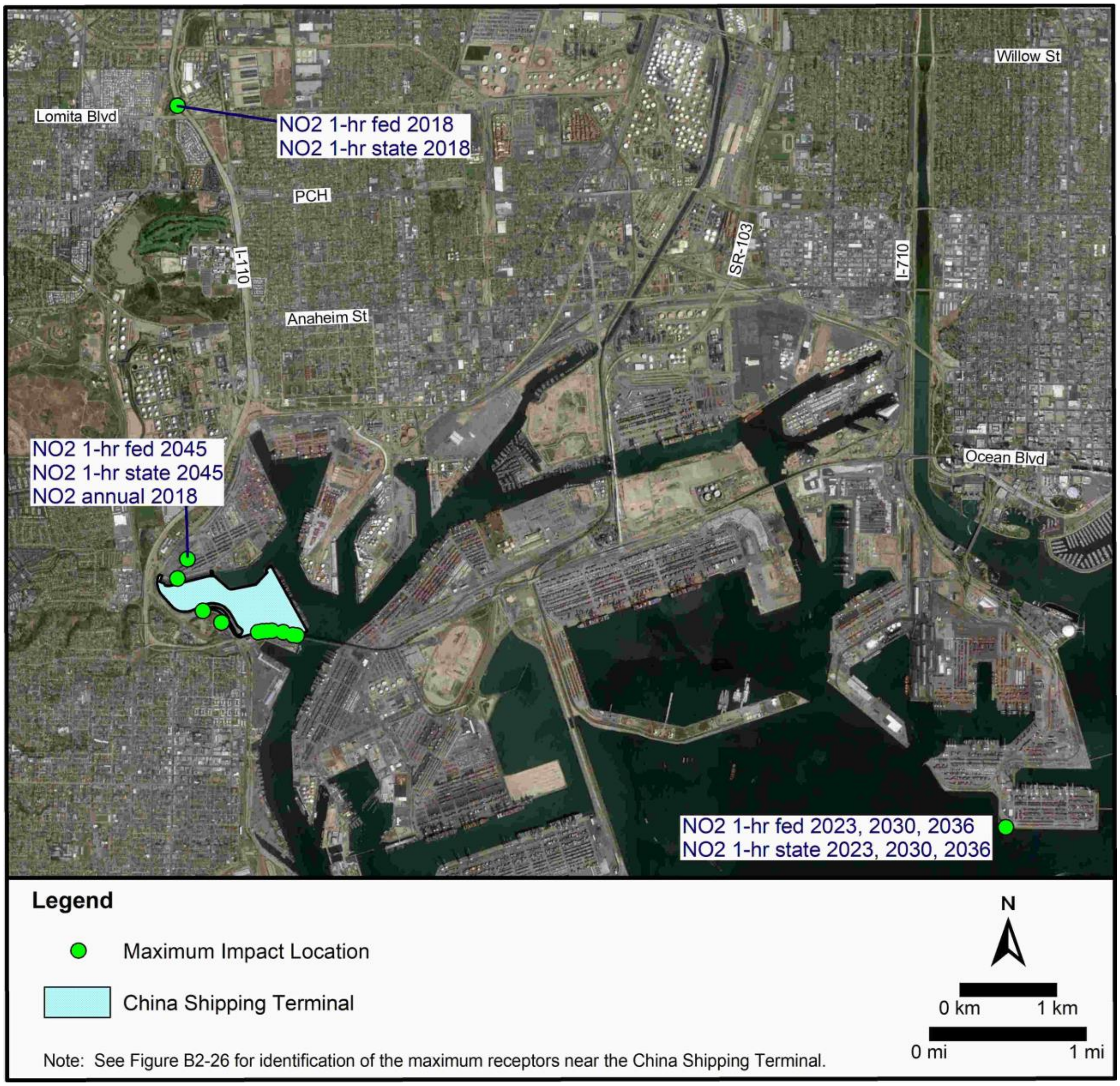
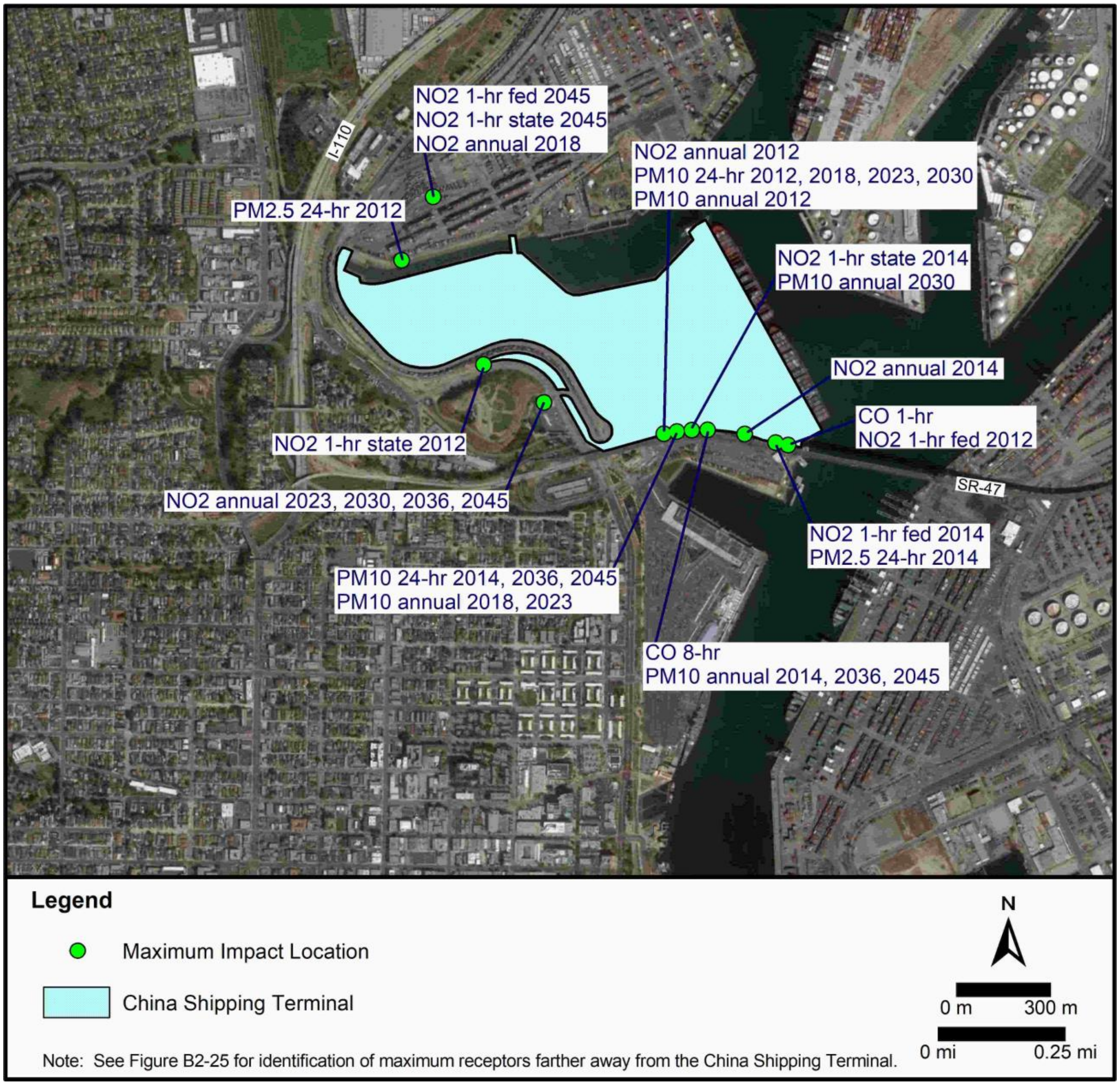


**Figure B2-26. Locations of Maximum Modeled Pollutant Concentrations Associated with the FEIR Mitigated Scenario (near field)**



Figures B2-27, B2-28, B2-29, B2-30, and B2-31 show the areas where the 24-hour $PM_{10}$ concentration increments associated with the FEIR Mitigated Scenario would exceed the significance threshold in 2014, 2023, 2030, 2036, and 2045, respectively. Figures B2-32, B2-33, B2-34, B2-35, and B2-36 show the areas where the annual $PM_{10}$ concentration increments associated with the FEIR Mitigated Scenario would exceed the significance threshold in 2014, 2023, 2030, 2036, and 2045, respectively. None of the exceedance areas would extend over existing residences.

**Figure B2-27. Area of Threshold Exceedance for the FEIR Mitigated Scenario; 2014 24-Hour $PM_{10}$ Concentration Increments**

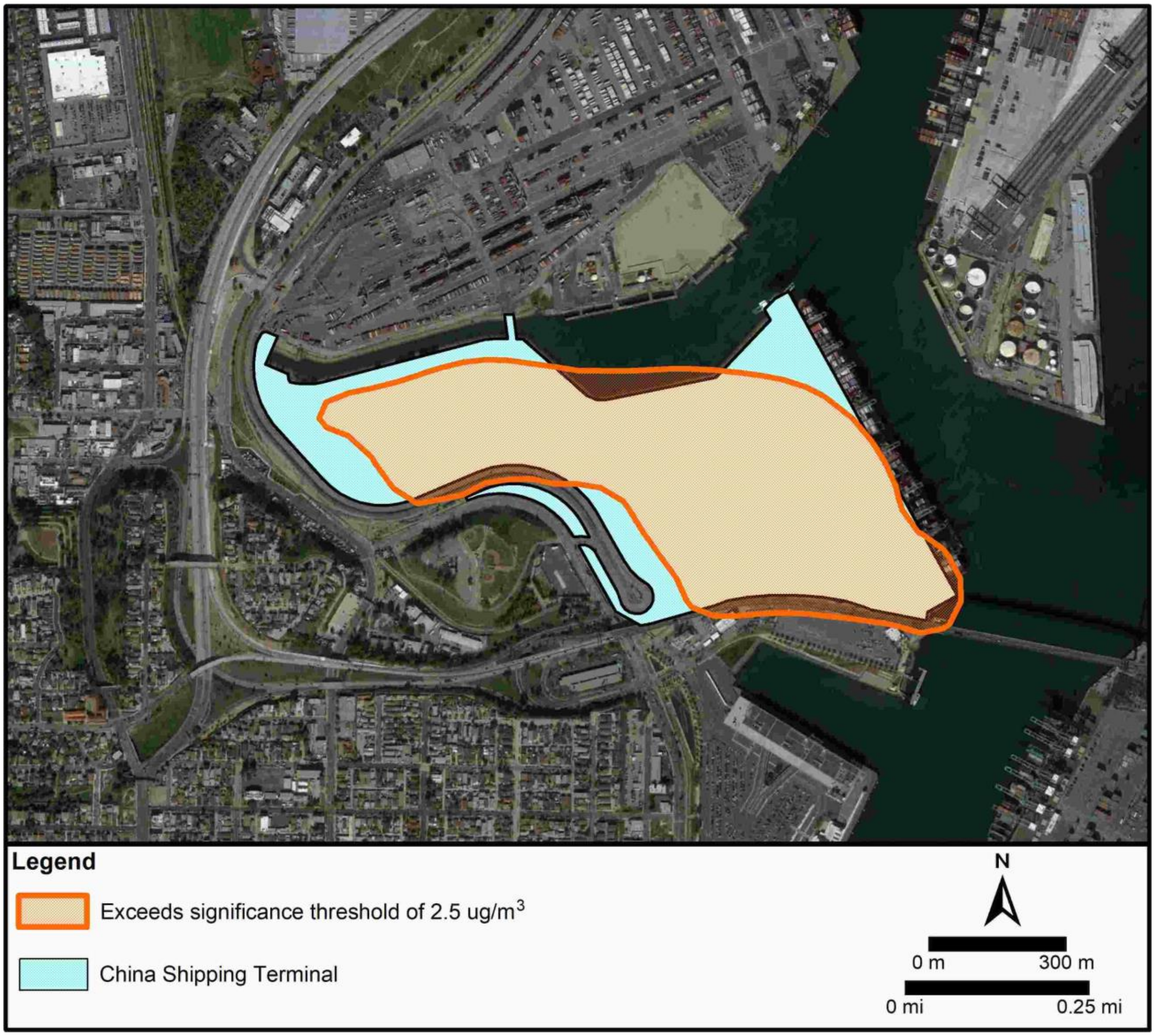


**Figure B2-28. Area of Threshold Exceedance for the FEIR Mitigated Scenario; 2023 24-Hour $PM_{10}$ Concentration Increments**

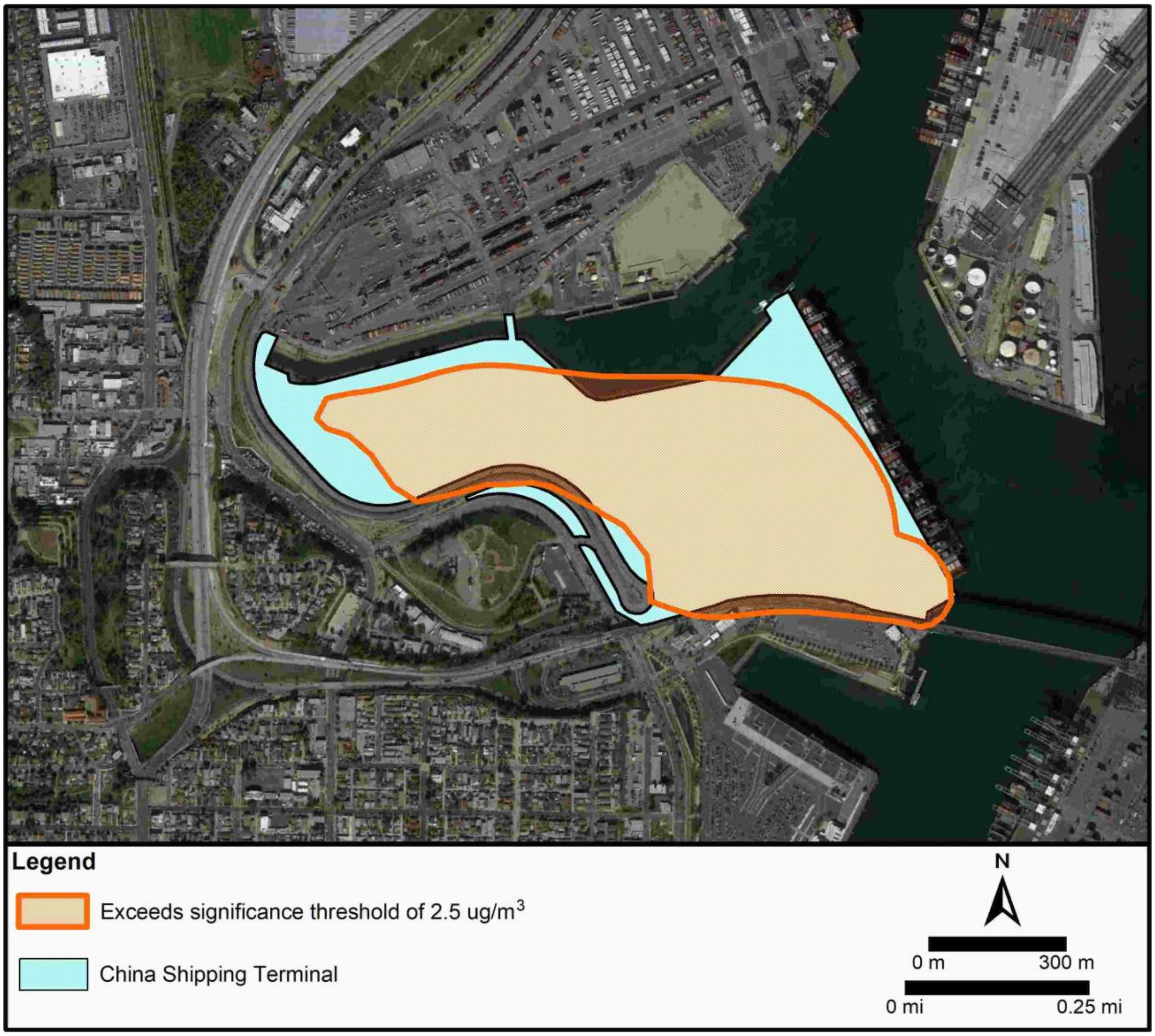


**Figure B2-29. Area of Threshold Exceedance for the FEIR Mitigated Scenario; 2030 24-Hour $PM_{10}$ Concentration Increments**

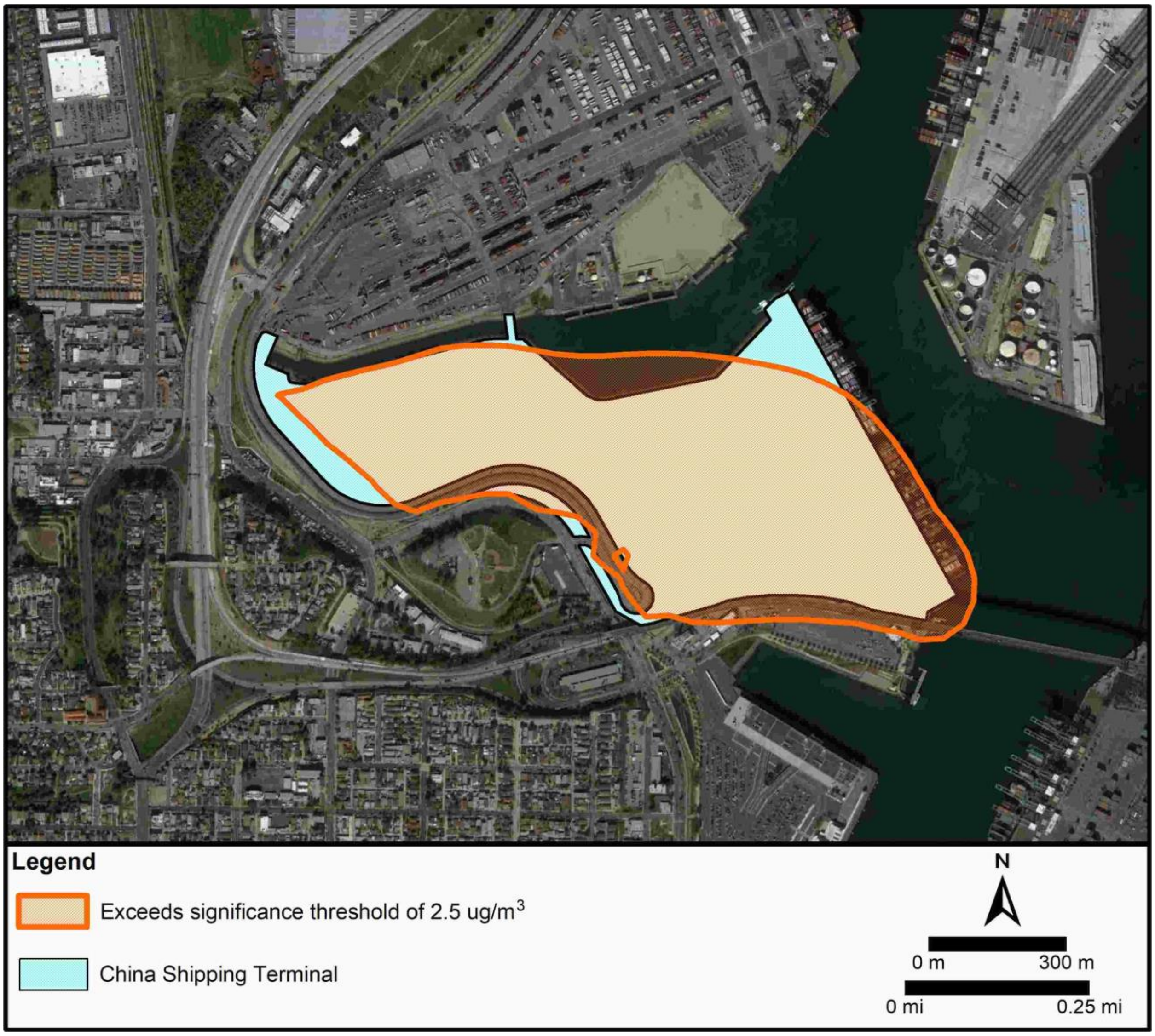


**Figure B2-30. Area of Threshold Exceedance for the FEIR Mitigated Scenario; 2036 24-Hour $PM_{10}$ Concentration Increments**

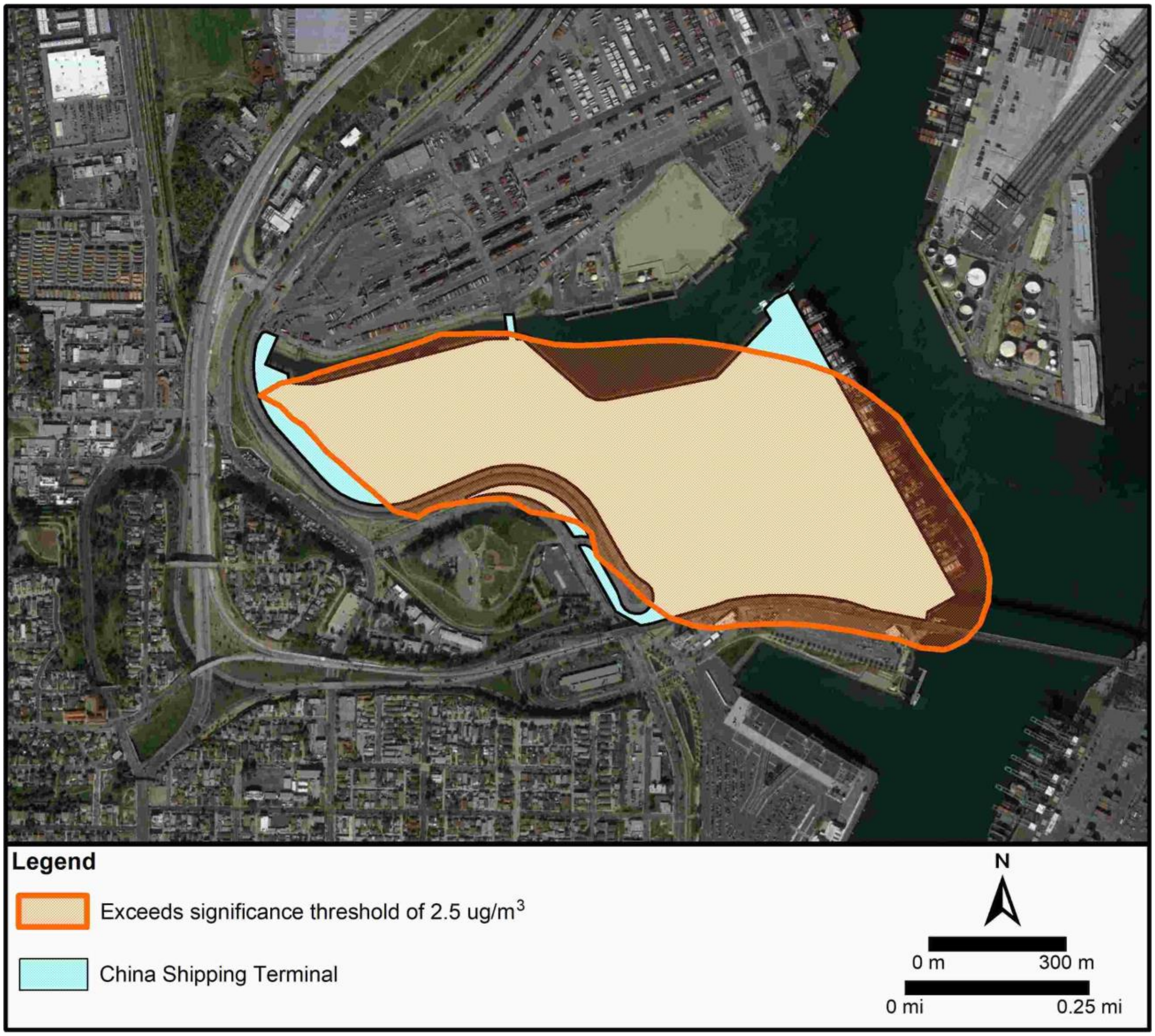


**Figure B2-31. Area of Threshold Exceedance for the FEIR Mitigated Scenario; 2045 24-Hour $PM_{10}$ Concentration Increments**

**Figure B2-32. Area of Threshold Exceedance for the FEIR Mitigated Scenario; 2014 Annual $PM_{10}$ Concentration Increments**

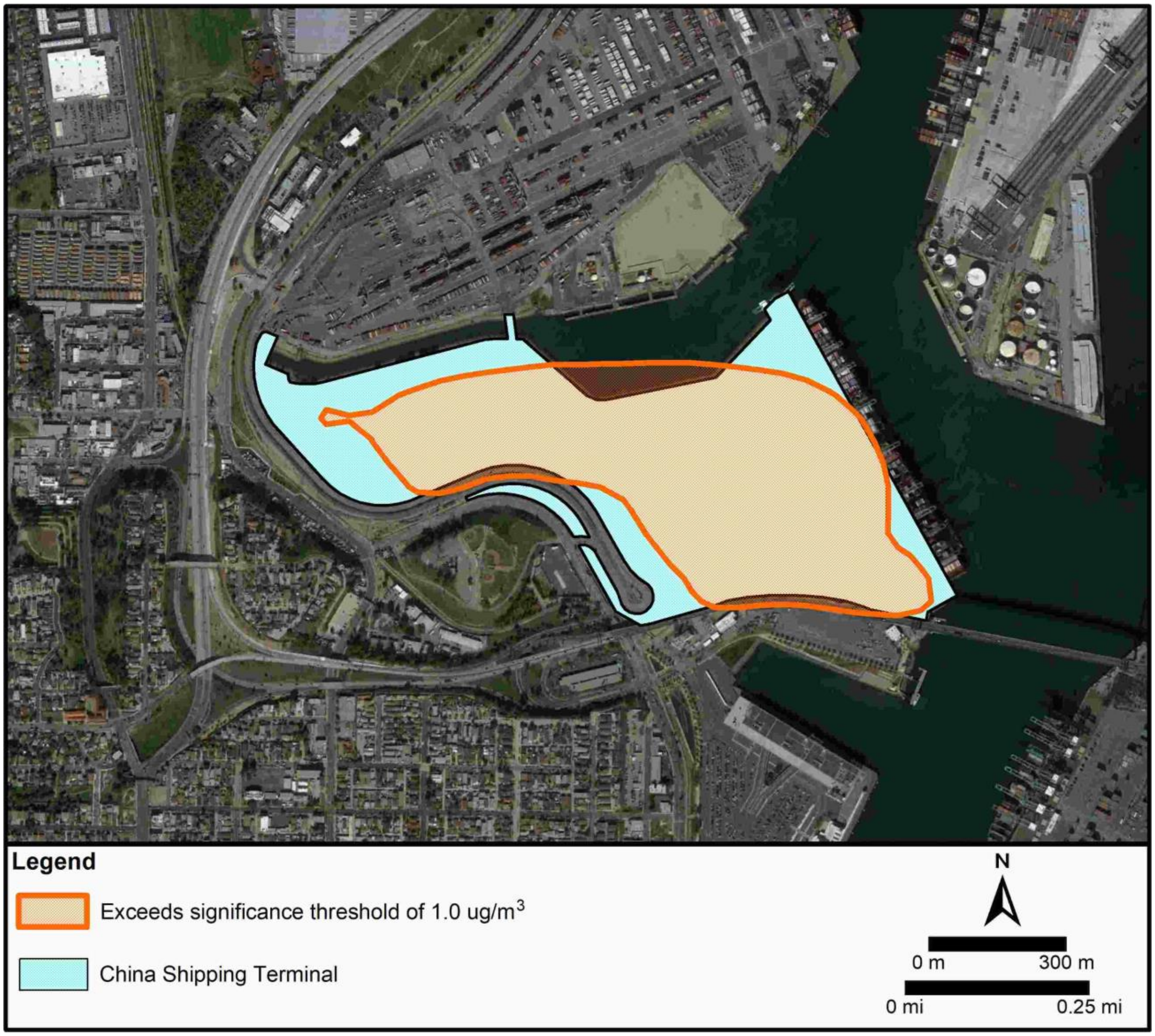


**Figure B2-33. Area of Threshold Exceedance for the FEIR Mitigated Scenario; 2023 Annual $PM_{10}$ Concentration Increments**

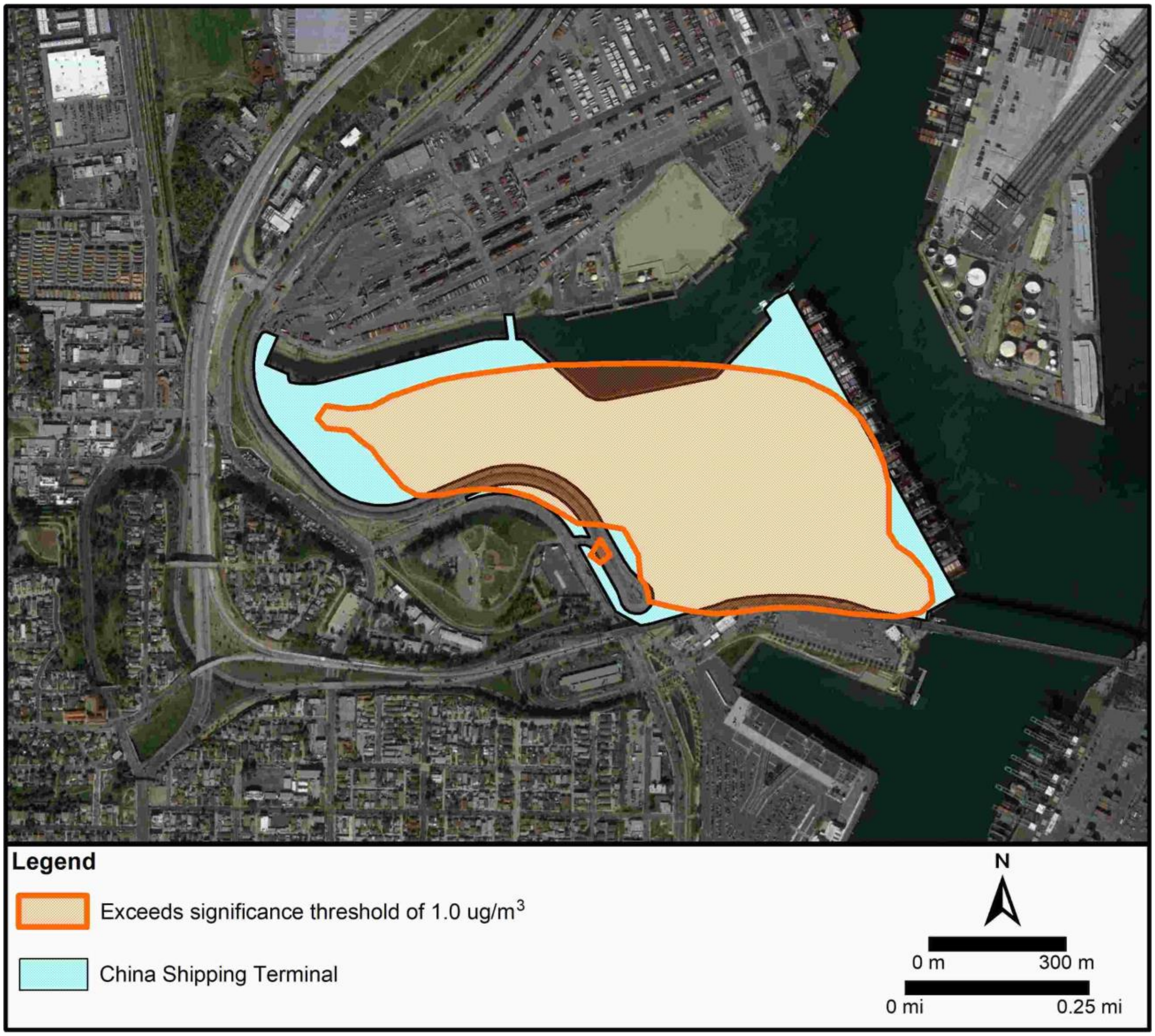


**Figure B2-34. Area of Threshold Exceedance for the FEIR Mitigated Scenario; 2030 Annual $PM_{10}$ Concentration Increments**

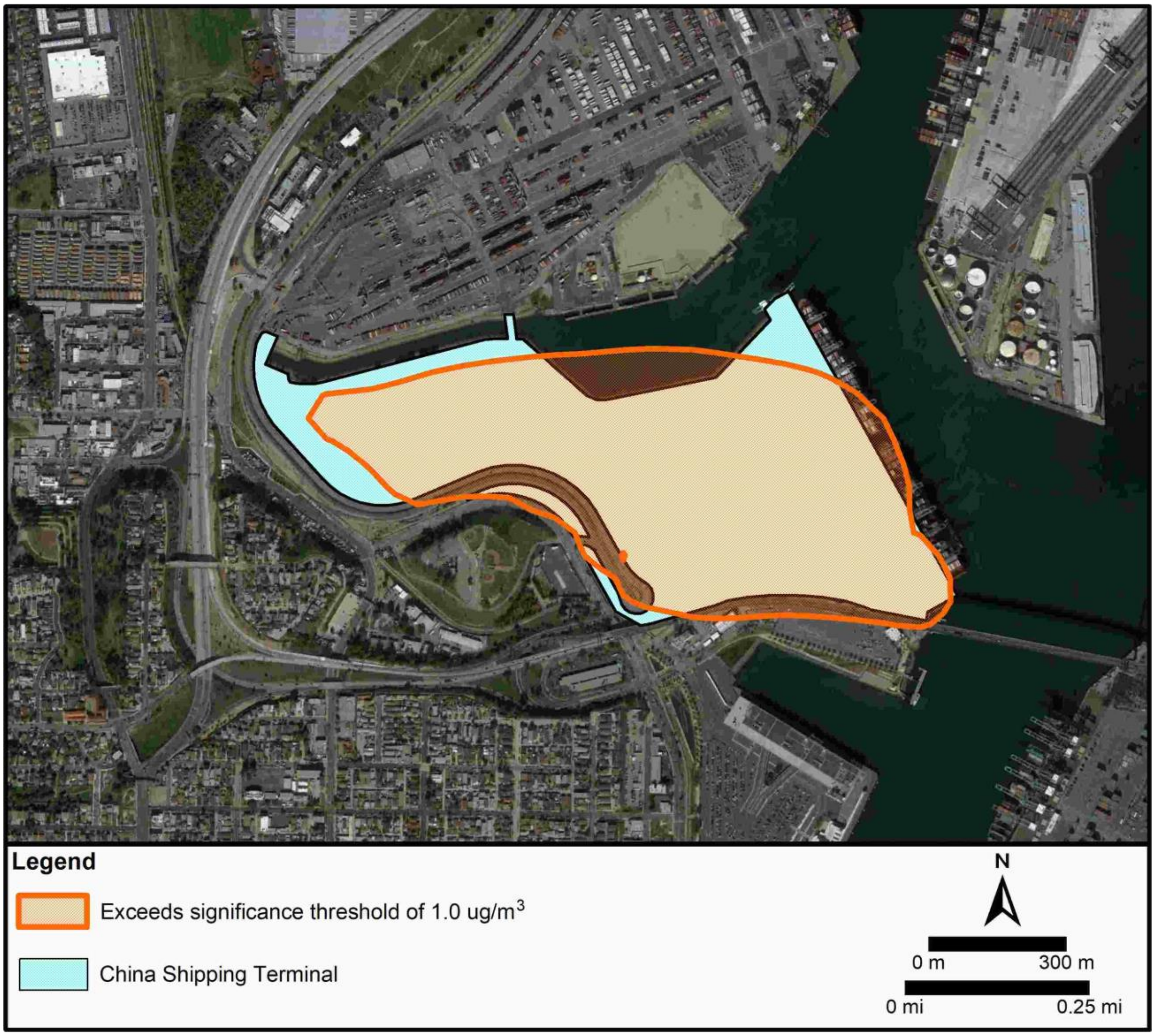


**Figure B2-35. Area of Threshold Exceedance for the FEIR Mitigated Scenario; 2036 Annual $PM_{10}$ Concentration Increments**

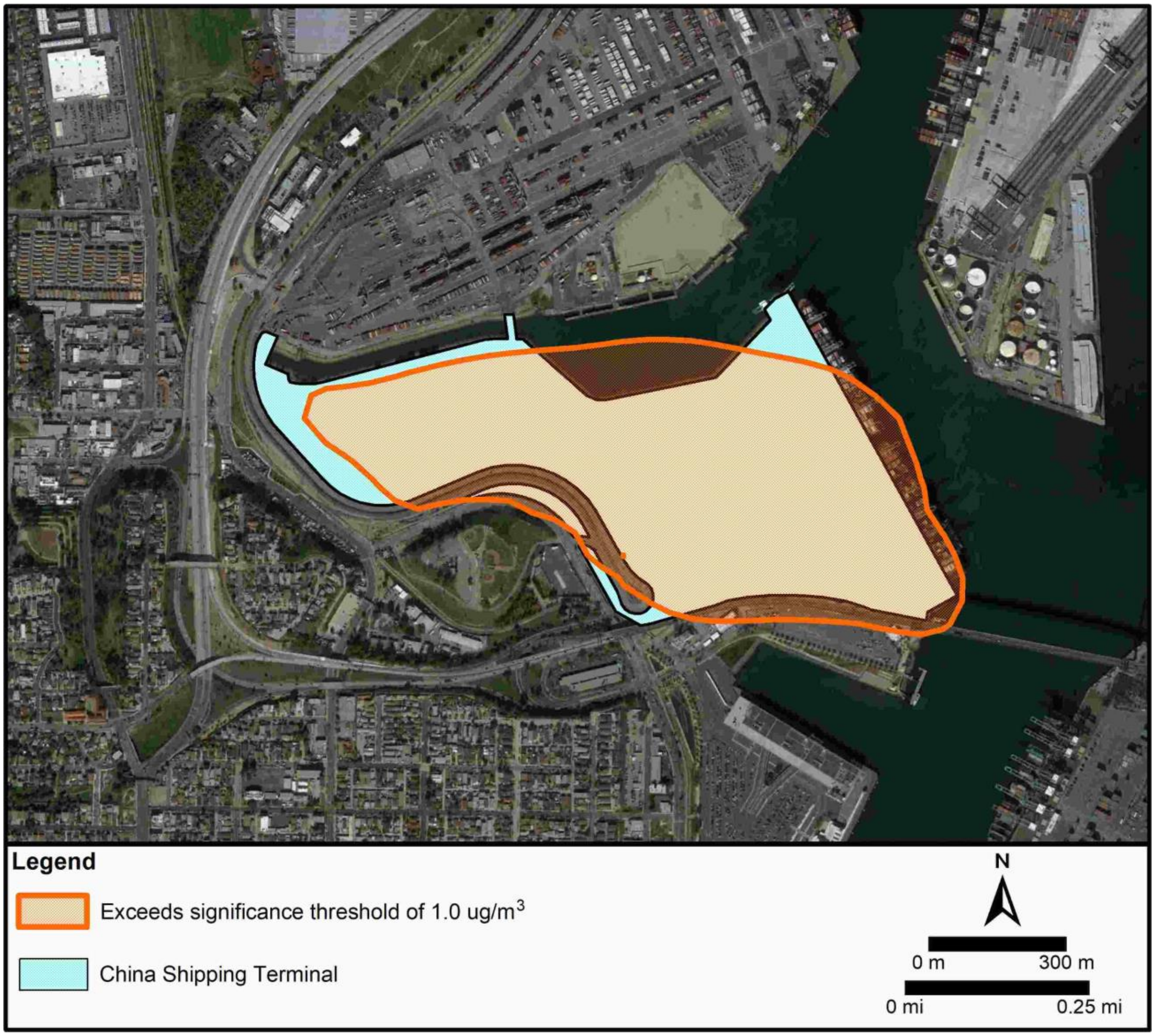
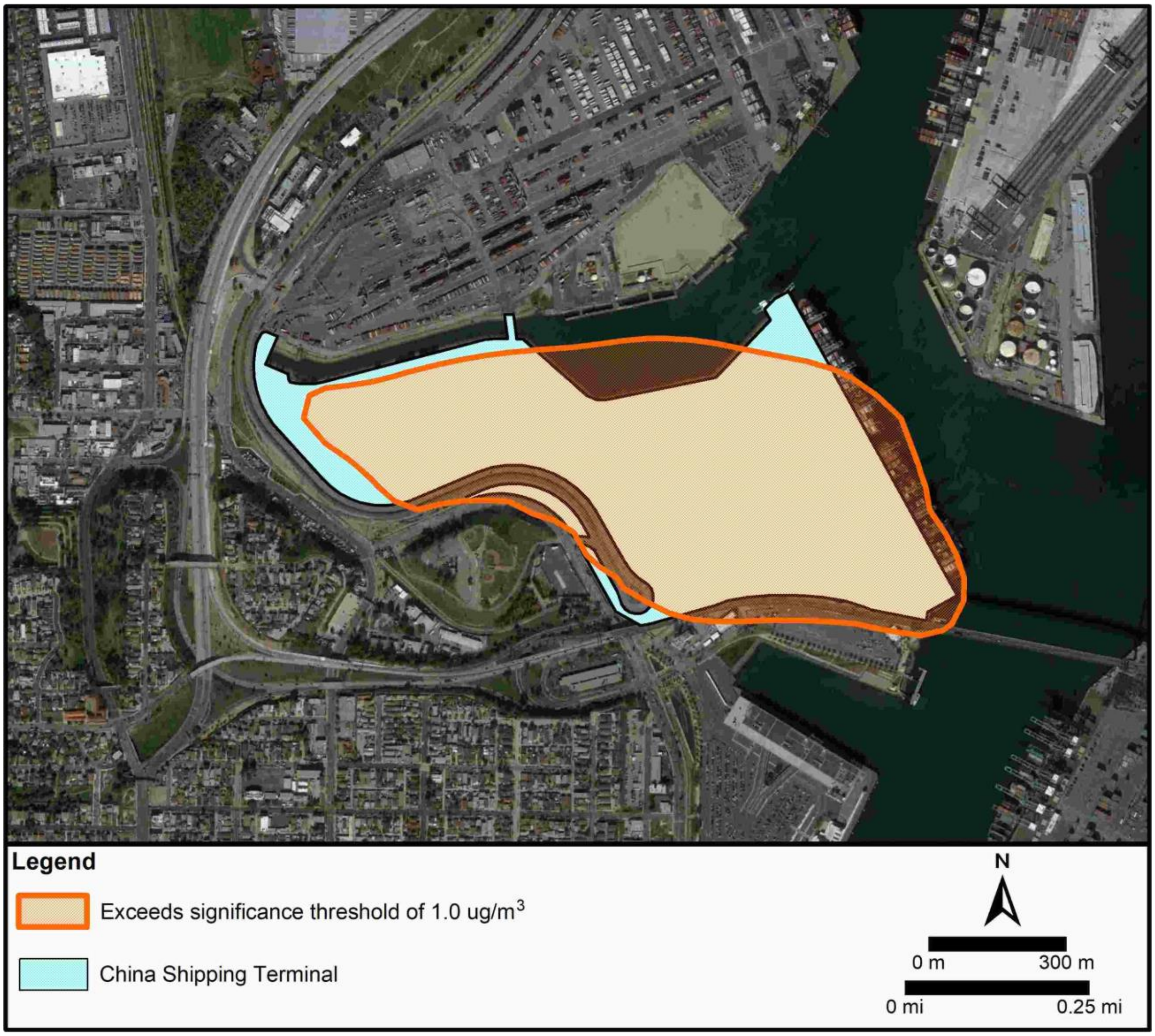


**Figure B2-36. Area of Threshold Exceedance for the FEIR Mitigated Scenario; 2045 Annual $PM_{10}$ Concentration Increments**



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