APPENDICES

AB 617 COMMUNITY AIR MONITORING PLAN (CAMP) FOR THE WILMINGTON / CARSON / WEST LONG BEACH COMMUNITY

South Coast Air Quality Management District

April 2019

Version 1

Contents

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Appendix A: List of Available Field and Laboratory Instruments

TABLE 1 - LIST OF AVAILABLE FIELD EQUIPMENT

MAKE MODEL	SPECIES MEASURED	MEASUREMENT PRINCIPLE	SOUTH COAST AQMD SOP	MINIMUM REPORTING LIMIT	UNITS AVAILABLE	TYPE	SAMPLING RATE
MET ONE, BAM 1020	PM2.5, PM10	Beta Ray Attenuation	SOP00072	4.8 µg/m^3 (hourly) 1 µg/m^3 (daily)	1	Continuous	Hourly
THERMO SCIENTIFIC, MODEL 55I	Methane, and Non-methane Hydrocarbons	Gas Chromatography (Flame Ionization Detector)	SOP00145	0.05 ppm (300s)	2	Continuous	Hourly
MOCON, 9000 NMHC ANALYZER	Methane, and Non-methane Hydrocarbons	Gas Chromatography (Flame Ionization Detector)	SOP00138	0.5, 0.1 ppm (Daily)	2	Continuous	Hourly
XONTECK, 901 VOC SAMPLERS	VOC	Active Sampler	SOP00080 (For Previous Model 910)		6	Time Integrated	NA
MESALABS, OMNI SAMPLER	PM Speciation, Metals, Hexavalent Chromium	Active Sampler	SOP00170		36	Time Integrated	NA
PICARRO, G2204	CH_4, H_2S	Cavity Ring Down Spectroscopy	SOP00157	5 ppb	1	Continuous	One Second

MAKE MODEL	SPECIES MEASURED	MEASUREMENT PRINCIPLE	SOUTH COAST AQMD SOP	MINIMUM REPORTING LIMIT	UNITS AVAILABLE	TYPE	SAMPLING RATE
PQ100 SAMPLERS	PM Speciation, Metals, Hexavalent Chromium	Active Sampler	SOP00146		6	Time Integrated	NA
MET ONE , SASS SAMPLERS	PM	Active Sampler	SOP0086		5	Time Integrated	NA
XONTECK, 924 SAMPLERS	PM Speciation, Metals, Hexavalent Chromium	Active Sampler	SOP00094		8	Time Integrated	NA
TSI, DUSTTRAK	PM2.5, PM10	Light Scattering, Laser Diode	Draft in Progress	1 $\mu g/m^3$	3	Continuous	One Minute
MAGEE SCI. AETHALOMETER AE33	BC	Optical attenuation	SOP000142	0.01 $\mu g/m^3$	3	Continuous	One Minute
COOPER ENVIRONMENTAL XACT 625	Multi-Metals	Energy Dispersive X-Ray Fluorescence (EDXRF) Analysis	Draft in Progress	depends on the species	1	Continuous	One Minute
TELEDYNE, CPC MODEL 651	UFP	Condensation Particle Counter Super Saturated Vapor	SOP00143			Continuous	One Second
TSI, CPC	UFP	Condensation Particle Counter Super Saturated Vapor	SOP00143			Continuous	One Second
TELEDYNE, T200	NO, NO_2, NOx	Chemi-luminescence Detection	User Manual	0.4 ppb	3	Continuous	One Minute

MAKE MODEL	SPECIES MEASURED	MEASUREMENT PRINCIPLE	SOUTH COAST AQMD SOP	MINIMUM REPORTING LIMIT	UNITS AVAILABLE	TYPE	SAMPLING RATE
TELEDYNE, T640	PM2.5	Scattered Light Spectrometry	User Manual	0.1 µg/m^3	3	Continuous	One Minute
TELEDYNE, T300	CO	Gas Filter Correlation (GFC)	User Manual	0.2 ppm	3	Continuous	One Minute
VOC MONITOR (TBD)	VOC	TBD	TBD	TBD	2	Continuous	TBD
WIND SYSTEM	Meteorological Parameters				3	Continuous	One Second
LI-COR BIOSCIENCES, LI-7700	Methane	Wavelength Modulation Spectroscopy (WMS)	User Manual		1	Continuous	One Second
ENVIRO TECHNOLOGY, PAX	BC	Photoacoustic Extinctiometer	User Manual		1	Continuous	One Second
TBD (FAST-RESPONSE O_3)	O_3	TBD	TBD	TBD	1	Continuous	One Second
TBD (REFERENCE PM MONITOR)	PM	TBD	TBD	TBD	1	Continuous	Hourly
TBD (FAST RESPONSE PM MONITOR)	PM	TBD	TBD	TBD	1	Continuous	One Second
TBD (PARTICLE SIZER)	PM	TBD	TBD	TBD	1	Continuous	One Second

MAKE MODEL	SPECIES MEASURED	MEASUREMENT PRINCIPLE	SOUTH COAST AQMD SOP	MINIMUM REPORTING LIMIT	UNITS AVAILABLE	TYPE	SAMPLING RATE
TBD (H_2S MONITOR)	H_2S	TBD	TBD	TBD	3	Continuous	TBD
TBD (H_2S, O_3, NOX, CO)	H_2S, O_3, NOx, CO	TBD	TBD	TBD	12	Continuous	TBD
FIELD GAS CHROMATOGRAPH (AUTO-GC)	Speciated VOC	Gas Chromatography	User Manual	Depends on the species	1	Continuous	Hourly
PTR-TOF (PROTON TRANSFER-TIME OF FLIGHT MASS SPECTROMETER)	Speciated VOC	Chemical Ionization Mass Spectrometry	User Manual	10 ppt	1	Continuous	One Second

Note: The field instruments listed above is not exhaustive and the monitoring equipment that will be used for AB 617 may change depending on the project needs and CSC input. It should be noted that these resources will be used to satisfy the needs of all present and future AB 617 communities, and availability will depend on the specific air monitoring needs and objectives at each community, which is to be determined after consulting with each CSC.

TABLE 2 - LIST OF AVAILABLE LABORATORY EQUIPMENT

MAKE MODEL	SPECIES MEASURED	MEASUREMENT PRINCIPLE	SOUTH COAST AQMD SOP	MINIMUM REPORTING LIMIT	# OF INSTRUMENTS
AGILENT GC/MS WITH GAS PRECONCENTRATOR	VOC Air Toxics	TO-15, Gas Chromatography (Flame Ionization Detector)/Mass Spectrometry	SOP00008B	ppt	2
AGILENT GC WITH GAS PRECONCENTRATOR	C2-C12 Hydrocarbon Speciation (60 Components)	TO-14a, Gas Chromatography (Dual Column with Flame Ionization Detectors)	SOP00007	ppt	2
THERMO UHPLC	Formaldehyde, Acetaldehyde,	Adsorbent Cartridge / Ultra High Performance Liquid Chromatography with Photodiode Array Detector	SOP00175	ng/m^3	1
DIONEX® ION CHROMATOGRAPHIC SYSTEM	PM Speciation, Hexavalent Chromium	Ion Chromatography	SOP0046	ppt	4
METROHM® CHROMATOGRAPHY SYSTEM	PM2.5 Cations	Ion Chromatography	SOP00002	ppb	1
DIONEX® MODEL ICS-2100	PM2.5 Anions	Ion Chromatography	SOP00003	ppb	1

MAKE MODEL	SPECIES MEASURED	MEASUREMENT PRINCIPLE	SOUTH COAST AQMD SOP	MINIMUM REPORTING LIMIT	# OF INSTRUMENTS
DRI MODEL 2001 THERMAL/OPTICAL CARBON ANALYZER	PM2.5 Elemental, Organic & Total Carbon	Thermal/Optical Carbon Analysis	SOP00001	µg/cm^2	2
SARTORIUS MC5 MICROBALANCE	PM2.5 Mass	Gravimetric Analysis	SOP00104	µg	2
PERKIN ELMER ELAN® DRC II ICP-MS	PM Speciation, Metals	Inductively Coupled Plasma – Mass Spectrometry	SOP00096/ QA0057	ppt to ppb	1
PANALYTICAL EPSILON 5®	PM2.5 Metals	Energy Dispersive X-Ray Fluorescence Spectrometry	SOP00004	µg/cm^2	1
ZEISS EVO|MA 10 EQUIPPED W/ BRUKER XFLASH 6|10	Bulk Samples	Scanning Electron Microscopy/ Energy Dispersive X-ray	Manufacture Manual	trace	1
OLYMPUS BH2 / BH51	Bulk Samples/ Asbestos Fibers	Polarized Light Microscopy	SCAQMD Method 300 (Asbestos),301 (Bulk), 317 (Fibers)	trace	2 (BH2) / 1 (BH51)
BRUKER LUMOS FTIR-MICROSCOPE WITH MACRO DIAMOND ATR	Bulk Materials/ Fibers	FT-IR Microscopy	SCAQMD Method 301 (Bulk), SOP00178	trace	1
PANALYTICAL X'PERT PRO X-RAY DIFFRACTOMETER (XRD)	Bulk Materials	X-Ray Diffraction Spectroscopy	SCAQMD Method 301 (Bulk)	trace	1
AGILENT 7890 GC WITH AGILENT 355 SULFUR CHEMILUMINESCENCE DETECTOR	Sulfur	Chemi-luminescence	SCAQMD Method 307	ppb	1

MAKE MODEL	SPECIES MEASURED	MEASUREMENT PRINCIPLE	SOUTH COAST AQMD SOP	MINIMUM REPORTING LIMIT	# OF INSTRUMENTS
THERMO FINNIGAN TRACE GC ULTRA	TNMNEVOC	Conversion to Methane Prior to Gas Chromatography with Flame Ionization Detector	SCAQMD Method 25.1	ppm	1
THERMO FINNIGAN TRACE GC ULTRA	Fixed Gases (Methane, Hydrogen, Oxygen, Nitrogen)	Gas Chromatography with Thermal Conductivity Detector	SCAQMD Method 10.1	%	1

Note: None of the laboratory equipment listed above has been purchased using AB 617 funds.

Appendix B: Air Monitoring Prioritization

The first step in implementing the proposed monitoring approach is to identify the areas within the WCWLB community that are most impacted by local air pollution sources and include the highest number of air quality concerns based on CSC and community feedback. South Coast AQMD staff gathered information on the main CSC air quality concerns through a series of community meetings, as described in the CAMP document. The following six categories were selected as the highest priorities: Refineries, Ports, Truck Traffic, Oil Drilling/Production, Railroads, and Sensitive Receptors (ranked in this order). A more detailed description on each of these groups is provided in the following sections. Since the WCWLB community covers a vast geographical area characterized by a wide variety of air pollution sources, a monitoring approach that integrates complementary air monitoring strategies (i.e. mobile, fixed and sensor monitoring; as described in detail in the CAMP document) is a robust strategy for addressing the highest priority concerns identified by the CSC in an effective and comprehensive manner.

The considerations provided below along with information on the specific air quality concerns identified by the CSC were used to prioritize the areas within WCWLB where appropriate monitoring should commence, as explained in the "Air Monitoring Prioritization Based on Community Input" section of the CAMP.

Main Air Quality Concerns Identified by the CSC

Refineries

The CSC identified refineries as the highest air quality concern for the purpose of this CAMP. Petroleum refineries process crude oil into various petroleum products with a main focus on transportation fuel production. The CSC expressed concerns on air pollution emissions deriving from storage tanks, potential refinery leaks, emissions from flaring (and flaring public notifications), and other fugitive emissions from refinery equipment. The Office of Environmental Health Hazard Assessment (OEHHA) in collaboration with the California Air Resources Board (CARB) and the Interagency Refinery Task Force has developed information on chemicals emitted from refineries and their health effects[1]. This document provides a list of chemicals and compounds that can be released from petroleum refineries, prioritized according to the volume of the chemicals emitted and their toxicity.

AB 617 monitoring will be designed to complement and enhance the air quality information that will be collected as part of Rule 1180. Rule 1180 was adopted by the South Coast AQMD Governing Board in December 2017 to mandate the implementation of real-time observations of air quality at or near the fenceline of all major refineries in the Basin and in nearby communities. Rule 1180 monitoring, which will begin in January of 2020, will provide real-time air quality data that will be used to understand long-term variations and trends of refinery related emissions. It will also help assess potential air impacts of refinery emissions in nearby communities and provide public notifications if emissions exceed pre-determined thresholds. Lastly, fenceline monitoring will enable refineries to detect and address leaks as quickly as possible. In addition, follow-up comprehensive mobile measurements around the refineries in the Basin and in the impacted communities will be conducted. Table 3 of the CAMP outlines the pollutants and technologies that will be utilized to satisfy the fenceline and community monitoring requirements of Rule 1180. Refinery measurements that will be collected as part of AB 617 implementation will also be used to

[1] Analysis of Refinery Chemical Emissions and Health Effects: https://oehha.ca.gov/media/downloads/faqs/refinerychemicalsreport092717.pdf

assess if the discrepancies between the measured and reported refinery emissions of VOCs and certain air toxics identified during the 2015 South Coast AQMD Optical Remote Sensing Study[2] still persist.

There are three major Areas impacted by refineries within the boundaries of the WCWLB community (Figure 1). Area a includes the Phillips 66 - Carson refinery; Area b includes Tesoro Carson and Tesoro Wilmington refineries, as well as the Phillips 66 – Wilmington refinery; and Area c includes the Valero Wilmington refinery. Areas A and B are surrounded by residential communities and sensitive receptors. Area c is located within an industrial neighborhood and adjacent to the ports, and does not have any residential communities in the surrounding 1 mile radius.

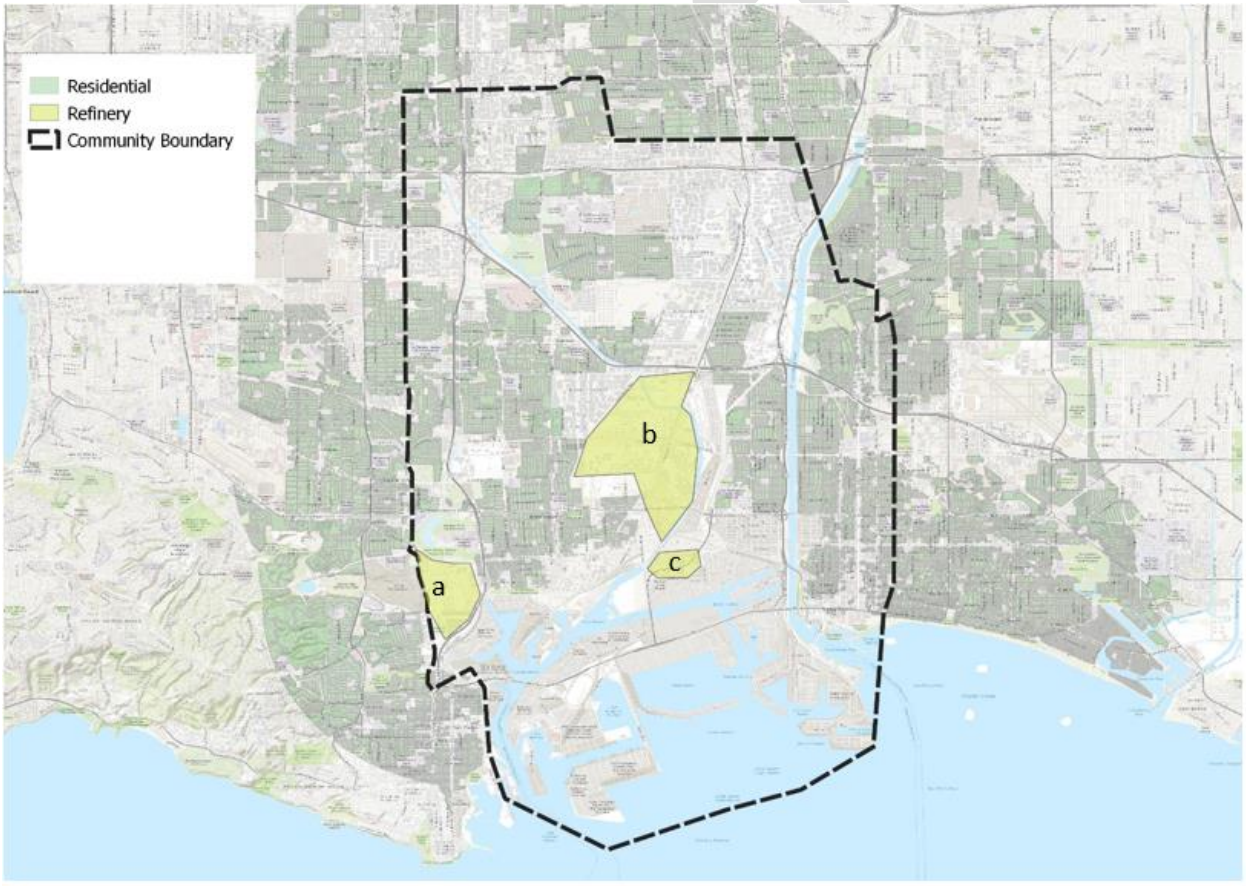

FIGURE 1 - REFINERIES IN THE WCWLB COMMUNITY

Figure 2 includes the information provided in Figure 1 with the addition of potential areas of interest for initial monitoring (e.g. mobile surveys), which have been selected based on their proximity to the refineries and general wind patterns. Figure 3 shows the wind roses representing typical wind patterns in WCWLB as measured by various meteorological stations in the area (i.e. Los Angeles Sanitation Meteorological Station; South Coast AQMD's Long Beach (Hudson) air quality station; and Port of Long Beach Inner Port air quality station). The dominant wind (measured over a full year in 2017) in WCWLB is

[2] 2015 South Coast AQMD Optical Remote Sensing Study: http://www.aqmd.gov/fenceline-monitoring

west-northwesterly and the communities on the east and southeast are most often downwind of refineries. The dominant land use type for these potential monitoring areas is residential. As mentioned earlier, the South Coast AQMD is in the process of establishing community air monitoring stations in WCWLB and other areas of the Basin as part of Rule 1180. The AB 617 and Rule 1180 programs will work hand-in-hand and in a complementary manner to best assess the impacts of refinery emissions on the WCWLB community.

The Phillips 66 – Wilmington refinery (Area a in Figure 2) is on the border of the community boundary as defined by the CSC group for AB 617. Two of the proposed monitoring areas selected around this refinery extend outside of the boundary of interest. While AB 617 monitoring will be focused on areas within the community boundary, Rule 1180 community monitoring will include those two areas outside the AB 617 boundary.

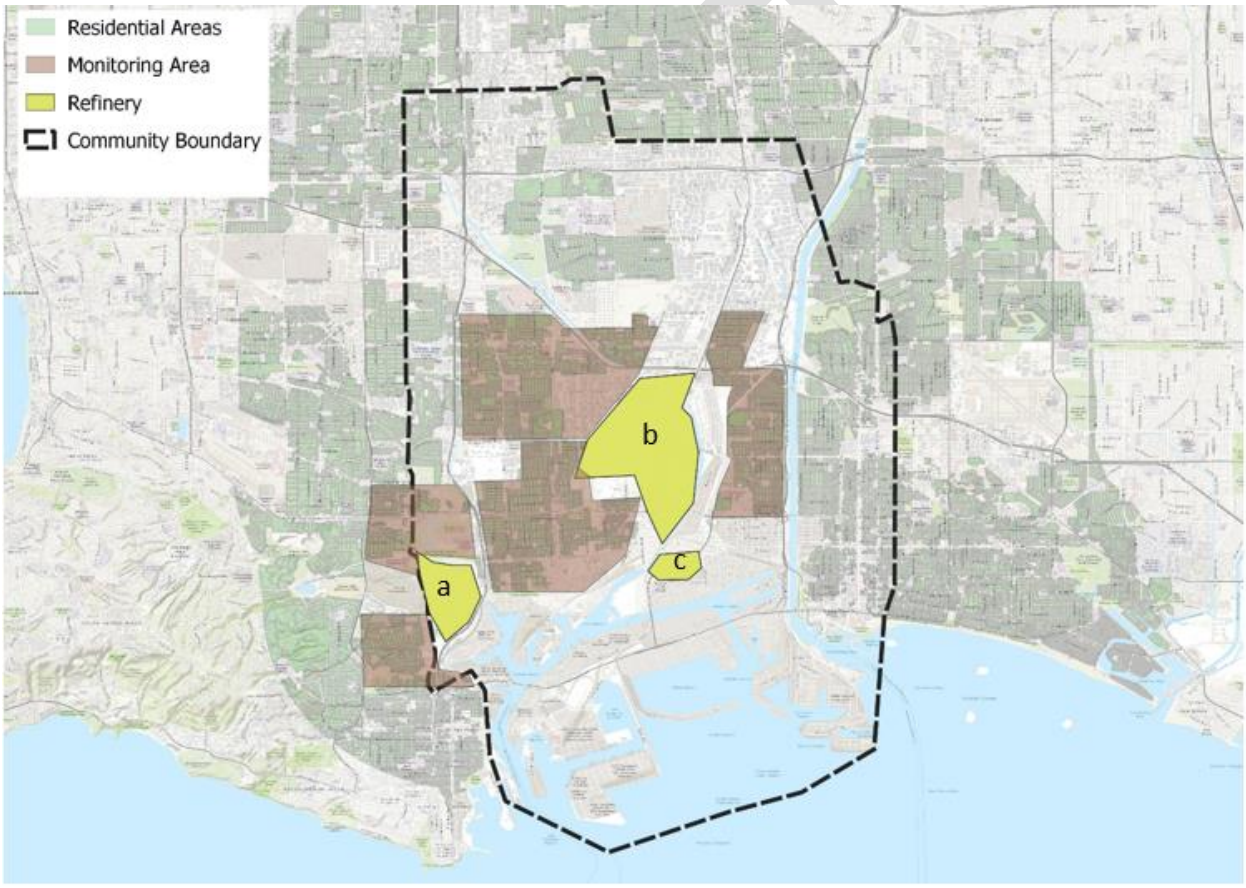

FIGURE 2 - POTENTIAL MONITORING AREAS

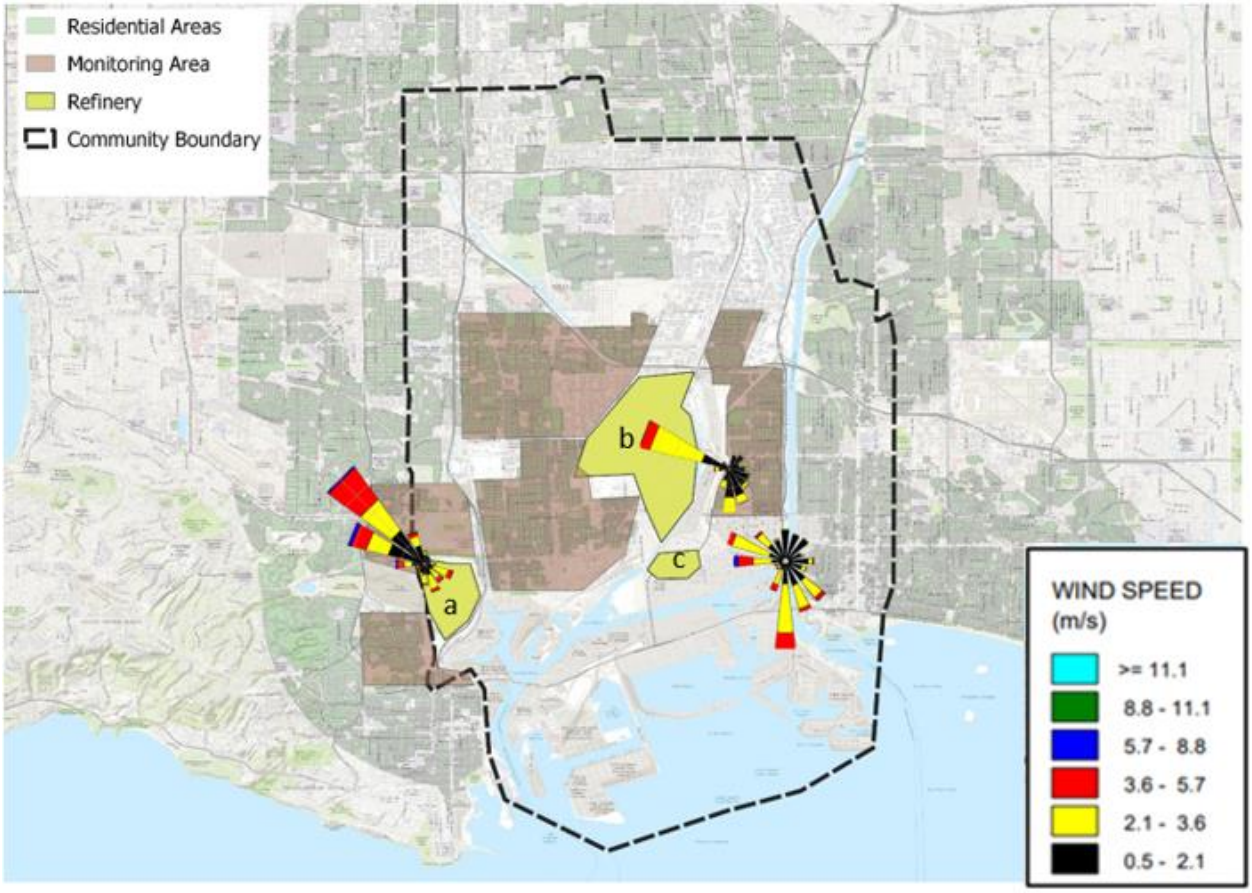

FIGURE 3 - PREDOMINANT WIND DIRECTION IN THE COMMUNITY BASED ON 2017 DATA. THE WIND ROSES ARE PLOTTED WHERE THE WIND STATIONS ARE LOCATED

Area a: Phillips 66 – Wilmington Refinery

This refinery is surrounded by Wilmington, Harbor City, Harbor Pines, Lomita, and San Pedro. The wind data from the Los Angeles Sanitation station shows that the dominant wind direction in this area is northwesterly (Figure 4). However wind direction and speed can vary greatly and during calm wind events fugitive emissions can accumulate and have a potential impact on all areas adjacent to a refinery.

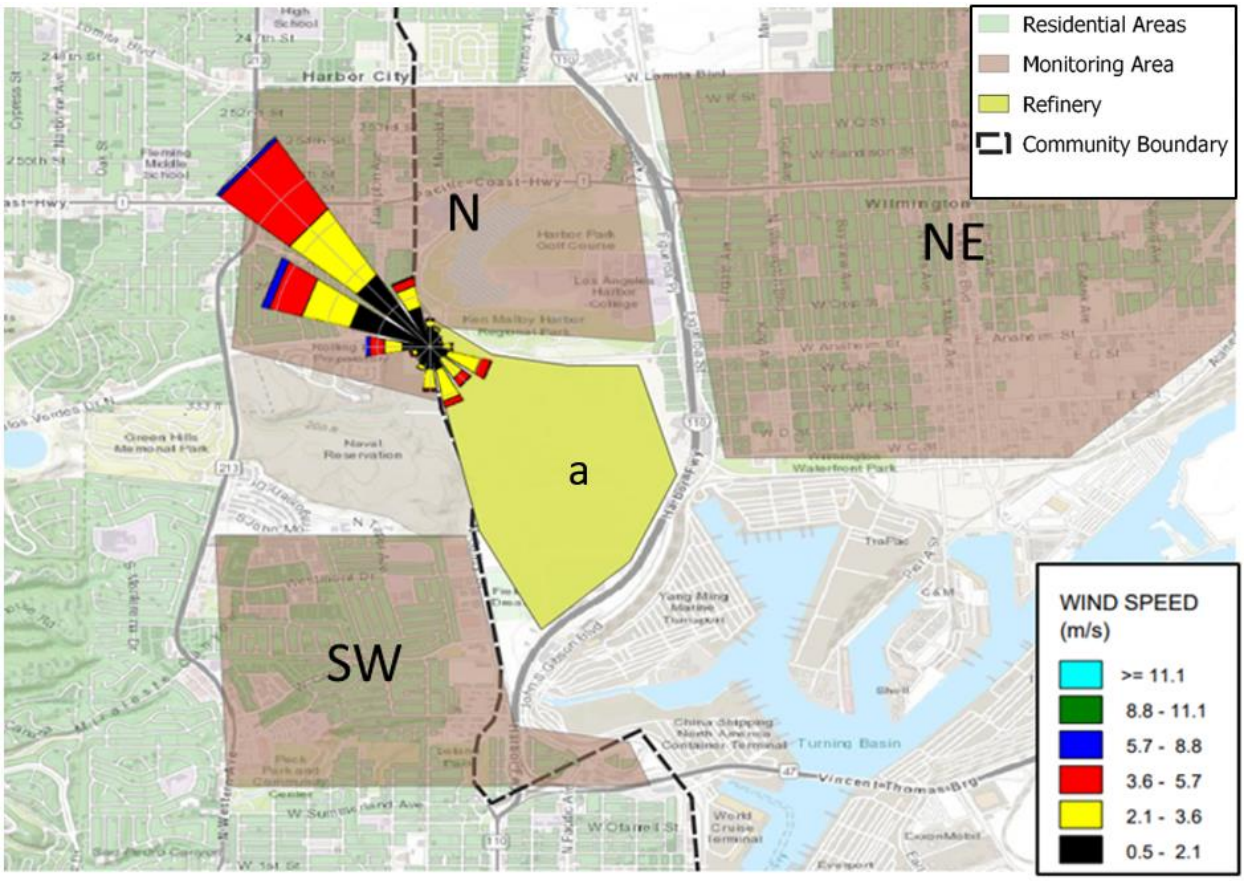

FIGURE 4 - AREA a, AND THE POTENTIAL MONITORING AREAS SURROUNDING IT. THE WIND ROSE IS PLOTTED WHERE THE WIND STATION IS LOCATED

The region north of the Phillips 66 – Wilmington refinery (identified by the shaded area labeled as "N" in Figure 4) is a mix of commercial and residential and includes a large park (Ken Malloy Harbor Regional Park) and the Los Angeles Harbor College. This region is downwind of the refinery when the wind direction is between 90 and 220°, which occurs about 27% of the time in a year (2017 data). Only the region that lies within the WCWLB community boundary will be considered for monitoring for the purpose of this CAMP.

The region northeast of the Phillips 66 – Wilmington refinery (identified by the shaded area labeled as "NE" in Figure 4) is mostly residential and includes elementary schools and a large park (Wilmington Waterfront Park). This region is downwind of the refinery when the wind direction is between 190 and 270°, which occurs about 12% of the time in a year (2017 data), mostly when winds are calm. It should be noted that the average wind speed when the wind is blowing in a northeasterly direction is relatively low, and the "NE" area is probably not the most impacted by potential fugitive emissions from the Phillips 66 – Wilmington refinery.

The region southwest of the Phillips 66 – Wilmington refinery (identified by the shaded area labeled as "SW" in Figure 4) is mostly residential. This region is downwind of the refinery when the wind direction is between 0 and 70°, which occurs about 7% of the time in a year (2017 data). Also, in this case, the average

wind speed when the wind is blowing in a south westerly direction is relatively low and only occurs about 7% of the time in a year (2017 data), and the "SW" area is probably not the most impacted by potential fugitive emissions from the Phillips 66 – Wilmington refinery. Although the "SW" area is, for the most part, outside of the WCWLB community boundary as defined by CSC, but may be considered as part of the Rule 1180 monitoring activities.

Area b: Tesoro – Carson; Tesoro – Wilmington; and Phillips 66 – Carson Refineries and Area c: Valero - Wilmington

These refineries are adjacent to one another and located in a very industrial part of the Basin. The wind data from South Coast AQMD's Long Beach (Hudson) air quality station was used for assessing the potential impact of refinery emissions in the surrounding locations.

The region east of Area B (identified by the shaded area labeled as "E" in Figure 5) is located in the City of Long Beach, and is mostly residential and includes numerous public parks and schools. This region is downwind of the refineries when the wind direction is between 200 and 350°, which occurs about 35% of the time in a year (2017 data).

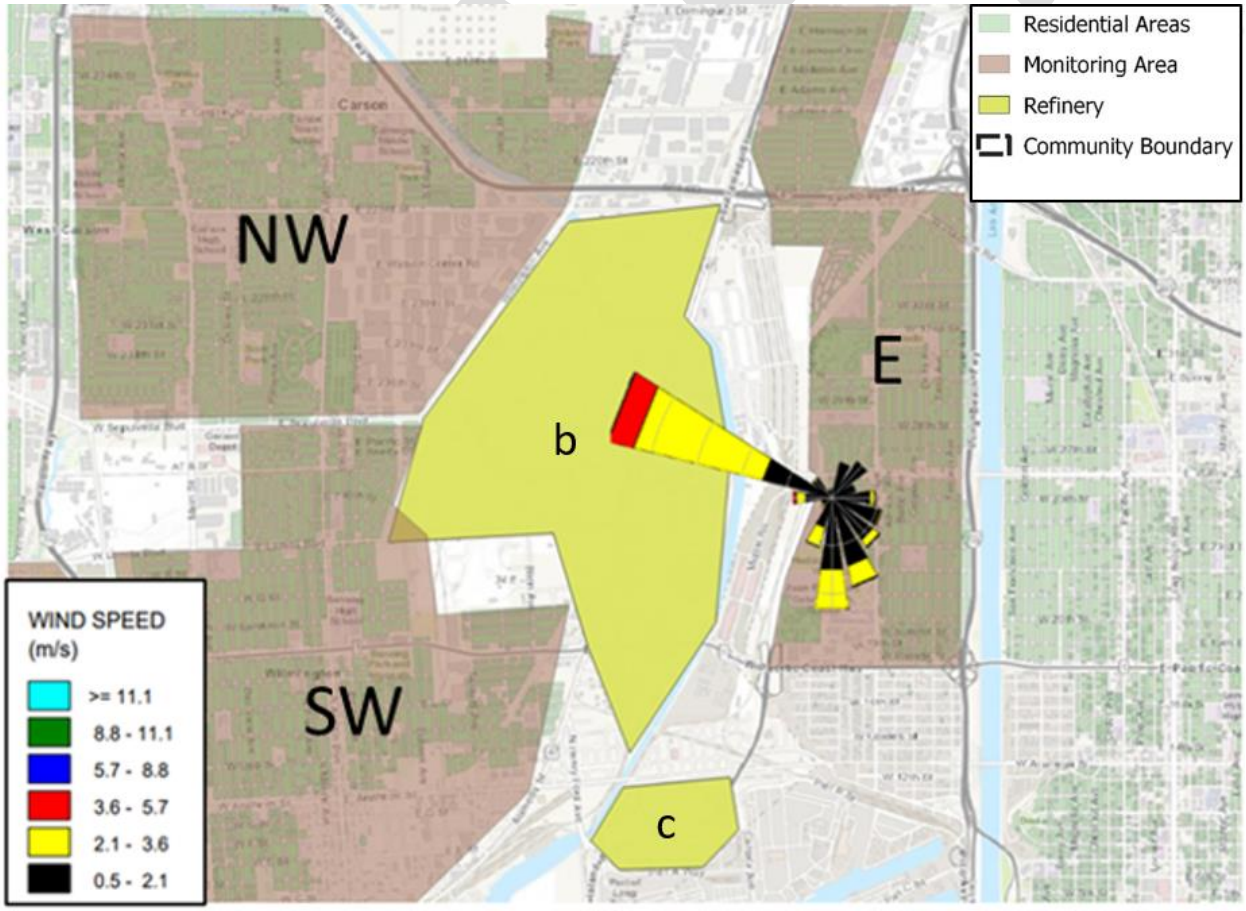

FIGURE 5 - AREA b (WHICH INCLUDES THREE REFINERIES) AND c AND THE POTENTIAL MONITORING AREAS. THE WIND ROSE IS PLOTTED WHERE THE WIND STATION IS LOCATED

The region northwest of Area b (identified by the shaded area labeled as “NW” in Figure 5) is located in the city of Carson, and is mostly commercial although includes some residential sections. This region is downwind of the refineries when the wind direction is between 90 and 180°, which occurs about 28% of the time in a year (2017 data).

The large region south west of Area b (identified by the shaded area labeled as “SW” in Figure 5) is mostly residential and is also the closest to Area c (which includes the Valero Wilmington refinery). This region is downwind of the Area b refineries when the wind direction is between 0 and 120°, which occurs about 37% of the time in a year (2017 data). The SW region is also downwind of Area c when the wind direction is between 90 and 120°, which occurs about 9% of the time in a year (2017 data). Finally, the region east of Area b (identified by the shaded area labeled as “E” in Figure 5) is also on the northeast of the Valero Wilmington refinery which increases its relative priority for air monitoring.

In summary, the shaded sections labeled as “Monitoring Area” in Figure 6 are the highest priority areas that will be considered for monitoring purposes based on proximity to the refineries and an analysis of the typical wind patterns in the region, which may impact where air pollutants from refinery emissions are transported.

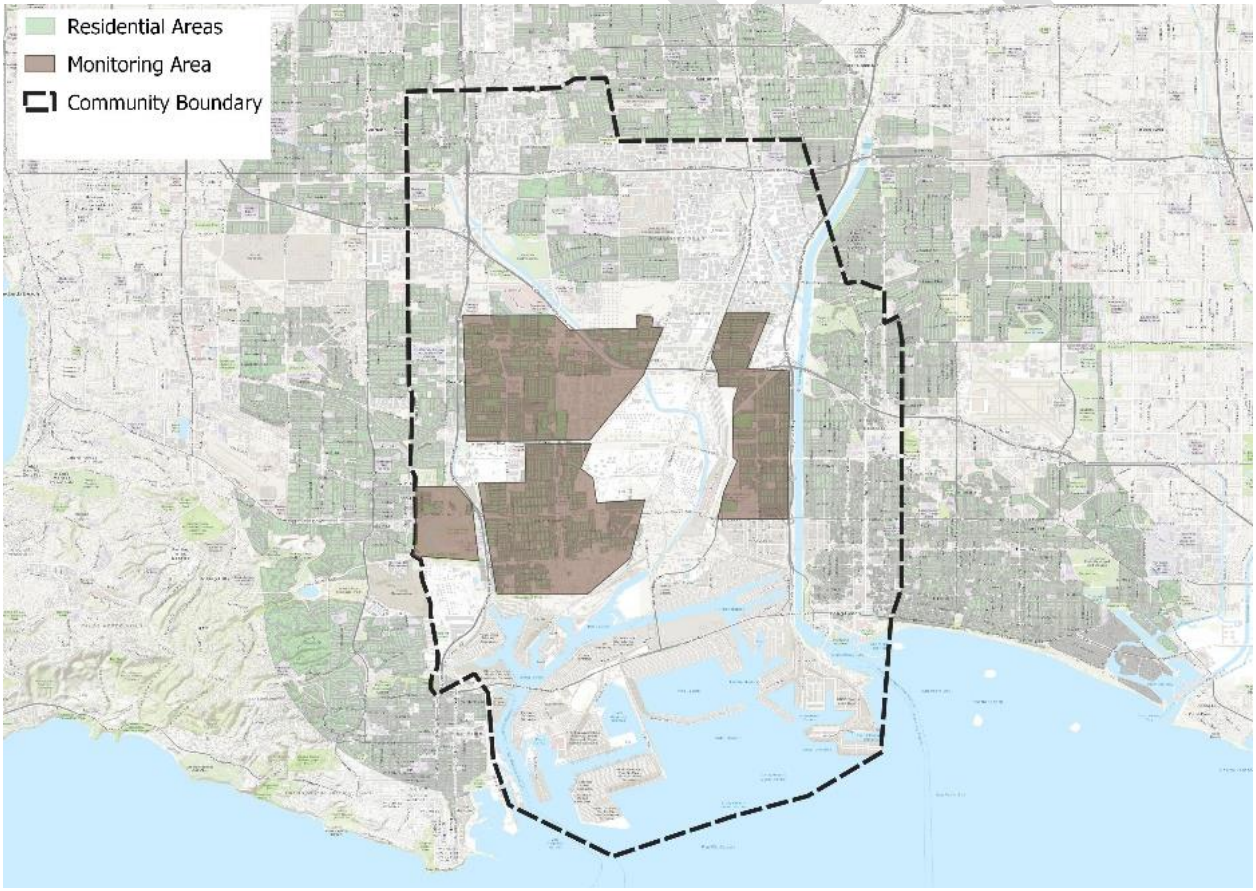

FIGURE 6 - AREAS CONSIDERED FOR MONITORING BASED ON POTENTIAL IMPACTS OF REFINERIES IN WCWLB

Ports

This community includes the largest portions of the Port of Los Angeles and Port of Long Beach. Port and port related activities were also identified by the CSC as some of the most important air quality concerns in WCWLB. Port-related emission sources include on-road heavy-duty trucks, locomotives, ocean-going vessels, oil tankers, commercial harbor craft, and cargo handling equipment. It should be noted that most of these sources have been identified as part of other high priority air pollution categories and are discussed in other sections of this Appendix. Figure 7 shows the areas most impacted by port related emissions. This area does not include any residential neighborhoods. The Ports of Los Angeles and Long Beach (Ports) have been implementing the San Pedro Bay Ports Clean Air Action Plan[3] (CAAP) since 2006. Implementation of strategies under the CAAP has led to early emission reductions as state, federal, and international regulations are developed. The Ports are in the process of updating the CAAP to adopt long-term sustainable strategies that could potentially result in criteria pollutant and greenhouse gas emission reductions, while improving operational efficiencies and reducing dependence on fossil-based fuels. As part of CAAP, the Ports each operate an air quality monitoring network which collect continuous data on ambient air quality and meteorological conditions in the San Pedro Bay region. The monitoring stations are strategically located throughout the Ports (Figure 7). Within the Port of Long Beach, the monitoring stations are located at (1) the Inner Harbor area, near West Long Beach, and (2) the Outer Harbor area on the Navy Mole. The Port of Los Angeles' stations are located in (1) the Outer Harbor area at Berth 47, (2) the Terminal Island Treatment Plant (TITP), (3) within the San Pedro community near the intersection of South Harbor Boulevard and 3rd Street, and (4) within the Wilmington Community at the Sts. Peter & Paul Elementary School.

The Ports' monitoring programs support their joint commitment to improving air quality within the San Pedro Bay region under the CAAP. The environmental information collected by these programs is used to better manage and provide feedback on the Ports' air quality improvement efforts. Each Port's monitoring station collects real-time measurements for various air pollutants including PM2.5, PM10, CO, NO_2, O_3, SO_2, and BC. The stations may also be used to collect other environmental data which can be used for different environmental studies. The real-time environmental data collected by these stations is available for public review at: http://caap.airsis.com/.

[3] San Pedro Bay Ports Clean Air Action Plan: http://www.cleanairactionplan.org/

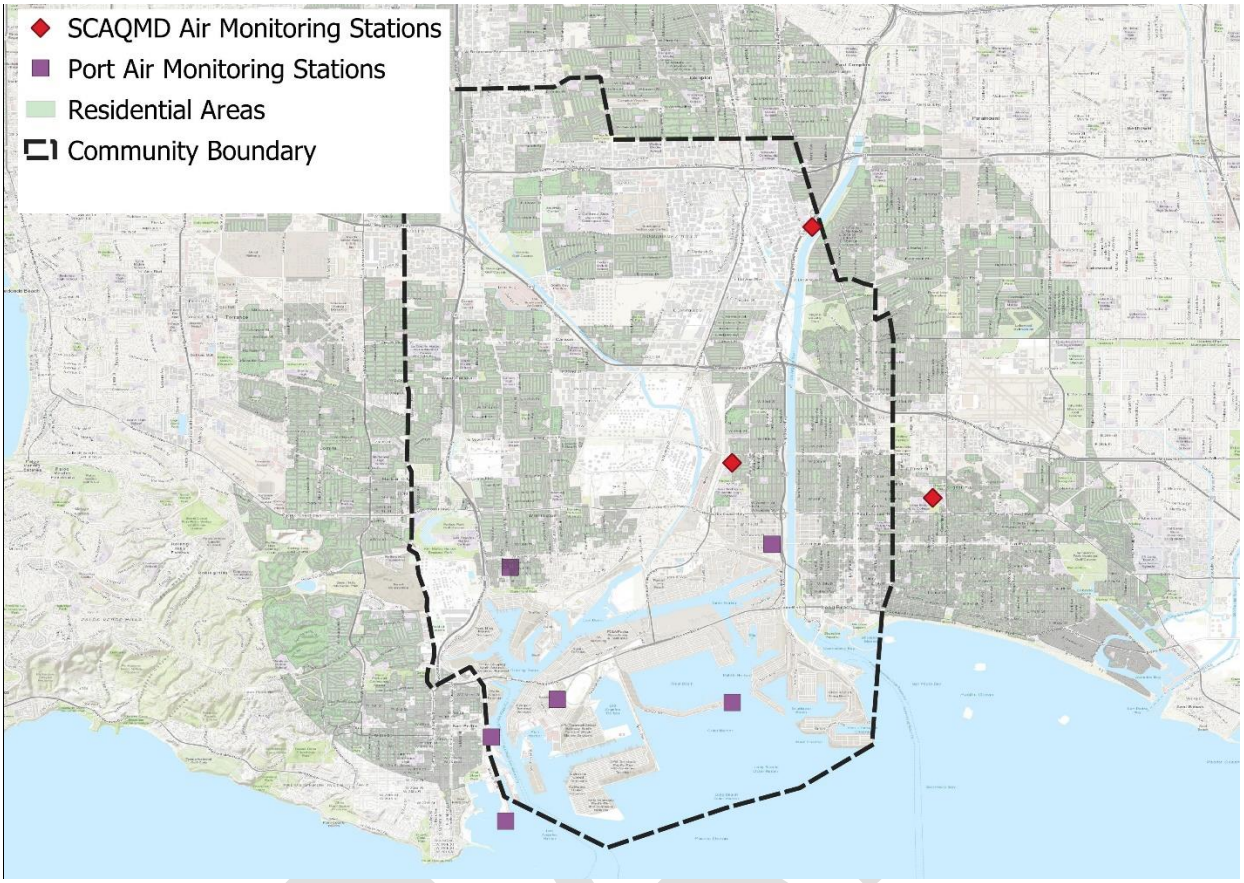

FIGURE 7 - PROPOSED MONITORING AREA NEAR AND AROUND THE PORTS

Monitoring for port related emissions will focus on identifying leaks from oil tankers. The monitoring could be followed up with additional verification and appropriate actions. Mobile and fixed measurements at and near the Ports will be conducted to identify potential high emitting ocean-going vessels and other sources to support subsequent actions. In particular, fixed multiple air monitoring stations (each including a PTR-MS and other equipment) will be deployed to measure hydrocarbons and sulfur for the purpose of identifying the cause(s) of the odor complaints that are often received by the South Coast AQMD in the coastal areas of Los Angeles during the summer months. A review of past complaint reports revealed two distinctive odor characteristics, one associated with sulfur, ranging from rotten egg to natural gas (odorant) smell, the other associated with a strong petroleum odor. Sources that are likely to be responsible for these odor complaints include ship emissions, off-shore platforms, oil production sites and other port related activities. These have been confirmed during past investigations by South Coast AQMD staff. The deployment of sensitive real-time instrument capable of detecting both sulfur and hydrocarbons will the help identify the specific source(s) of these odor complaints.

Also, monitoring for pollutants related to diesel emissions will be included to assess the contribution of Ports activities on measured pollutant levels in the impacted communities.

Truck Traffic

Truck traffic was selected by the CSC as one of the most important air quality concerns in this community. The WCWLB area is intersected by a multitude of public roads and freeways with high traffic volumes and a high fraction of diesel truck traffic due to presence of the Port of Long Beach and Port of Los Angeles and the associated goods movement. The specific concerns related to track traffic identified by the CSC include idling and moving trucks operated on freeways, intersections and major roadways, and their impact on local residents.

"Traffic density" data from CalEnviroScreen was used to screen for areas with highest traffic impacts (Figure 8). Two major areas with the highest density traffic and proximity to residential areas were prioritized for initial mobile measurements (Figure 9). It should be noted that the traffic density index provided by CalEnviroScreen to identify areas with increased motor vehicle traffic does not separate truck traffic from general traffic, and does not provide any information about idling trucks. Some of the specific areas with high density of idling trucks were identified by the CSC during the community meetings. These areas will be prioritized for initial air monitoring. Residential areas in close proximity to major roadways were also identified as part of this exercise (Figure 9). Although this informational gathering is meant to identify high priority areas where monitoring will begin, air quality measurements will extend to other areas in WCWLB. This is because this community is disproportionally impacted by diesel emissions from truck traffic related to goods movement from the Ports, around warehouses, and industrial facilities[4].

[4] Health Studies, Air Toxic Studies: http://www.aqmd.gov/home/air-quality/air-quality-studies/health-studies

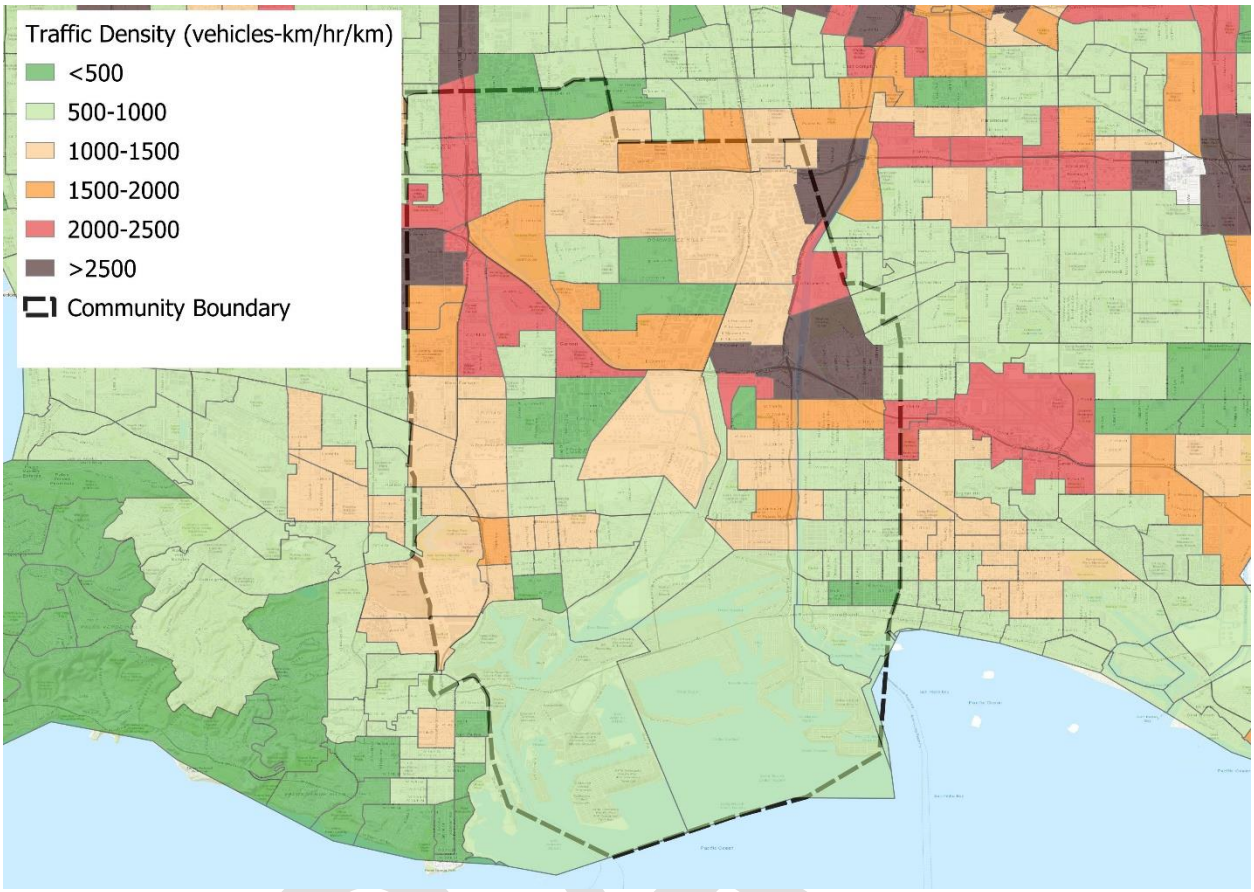

FIGURE 8 - TRAFFIC DENSITY MAP OBTAINED FROM CALENVIROSCREEN 3

Note: Traffic density is the sum of traffic volumes adjusted by road segment length (vehicle-kilometers per hour) divided by the total road length (kilometers) within 150 meters of the census tract boundary.

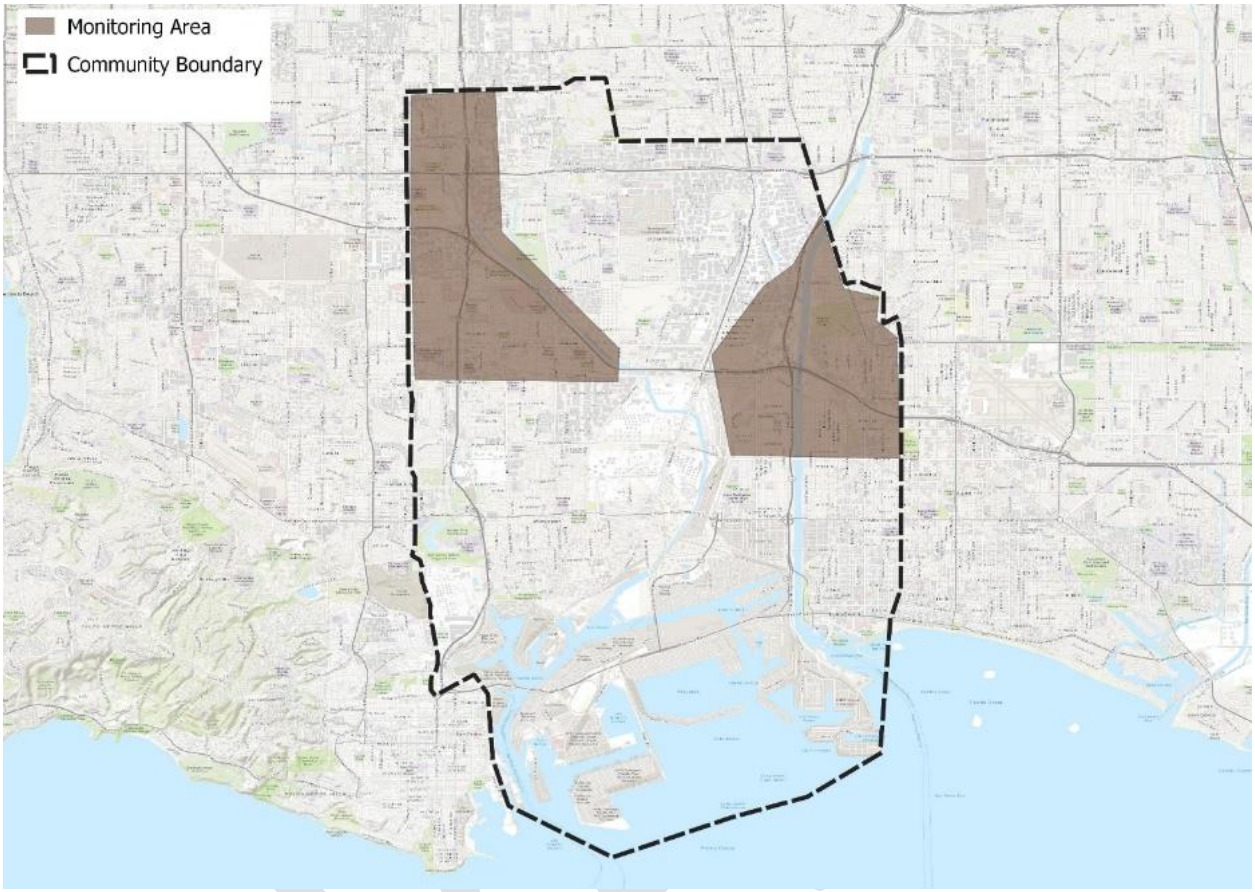

FIGURE 9 - PROPOSED MONITORING AREAS BASED ON TRAFFIC DENSITY AND DISTANCE TO MAJOR ROADWAYS

The monitoring strategy to study and characterize this particular air quality concern includes comprehensive mobile measurements and near-road monitoring with a focus on BC (a tracer for diesel PM) to identify air pollution hot spots and assess the impact of idling truck emissions on community exposure. Elevated air pollutant concentrations are generally expected at near-road locations than further away from the freeways and transportation corridors (e.g. community monitors). Near-road measurements will provide representative pollutant exposure information for people who live, work, or go to school adjacent to freeways or who spend significant time traveling on some of the busiest roadways in Southern California with a high fraction of diesel truck traffic. South Coast AQMD operates a near-road monitoring station within this community, located downwind of freeway I-710[5] (5895 Long Beach Blvd. Long Beach, CA 90805), measuring some of the major diesel emission tracers such as BC, NO_2 and PM2.5. VOCs and other air toxic pollutants may also be measured at this station as part of the AB 617 monitoring efforts.

[5] Long Beach Route 710 Near Road: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-monitoring-network-plan/aaqmnp-longbeach710-nearroad.pdf?sfvrsn=16

Oil Drilling & Production

This section outlines the rationale for selecting priority areas affected by pollution from oil wells, drilling, and oil production activities. In February 2018, the Los Angeles County Department of Public Health released a document[6] to provide communities and local policy-makers with an overview of relevant public health research and investigations related to the oil fields and oil production and drilling in California. The release of chemicals into the atmosphere from oil and gas activities can occur from surface operations, wells and pipelines, operation of diesel- or gas-powered equipment and vehicles, as well as from accidental releases. The CSC identified oil production and drilling (mainly leaks and accidental releases) as the second highest priority category in WCWLB because it is a well-known contributor to the pollution burden from stationary sources in this community. Air pollution effects of drilling are mostly local and can be considered as independent point sources. Particulate matter, NOx, BTEX compounds (benzene, toluene, ethylbenzene, and xylenes), and other VOCs are often associated with oil and gas extraction activities and could impact the communities residing near these areas.

Previous studies indicate that oil and gas wells are substantial contributors to the local air pollution burden from VOCs in the Los Angeles area. In a 2015 study conducted in collaboration with FluxSense, the South Coast AQMD monitored air quality around 61 different small stationary sources (including areas within the WCWLB community), out of which 17 were oil/gas extraction sites with 106 wells. Small sources are likely to contribute substantially to total VOC emissions from stationary sources, and oil wells may contribute to VOC emissions more than previously thought. FluxSense scaled-up median emission rates of the wells they surveyed to the total number of wells in the Basin, and estimated that the emission contribution from all active and inactive wells is larger than that of other source categories (refineries, gas stations, and tanks farms). While the 2015 FluxSense project notes uncertainties associated with scaling data to represent the Los Angeles Basin as a whole, it suggests that emissions of VOCs from oil and gas extraction sites may be considerably underestimated compared to emission inventories, and further studies are warranted. These FluxSense mobile measurements will be one of the primary AB 617 monitoring strategies for addressing this air quality concern raised by the CSC for AB 617. Overall, monitoring will focus on the detection of leaks; on improving current emissions inventory estimates; on providing public alerts if high levels are found; and on supporting the CERP by tracking progress and/or follow up actions. The proposed monitoring strategies include, but are not limited to, mobile measurements of pollutants identified above, with a focus on VOC emissions near oil and gas wells and in the impacted communities; potential VOC sensor deployments at selected oil drilling and production sites; and where levels are high, taking time-integrated samples for subsequent chemical analysis to assess the presence of potential air toxics species and/or their levels.

It is important to note that a variety of state and federal regulations require inspections, maintenance, testing, and leak detection systems for oil and gas facilities. Moreover, South Coast AQMD rules have requirements related to public notification and monitoring, after community concerns are identified (e.g. odor complaints) at a particular oil and gas operation. To better characterize air quality in communities near oil and gas operations, South Coast AQMD staff has been conducting mobile monitoring in multiple communities within the Basin (including WCWLB) as part of an EPA Community Scale Grant[7]. Results will

[6] Public Health and Safety Risks of Oil and Gas Facilities in Los Angeles County: http://publichealth.lacounty.gov/eh/docs/PH_OilGasFacilitiesPHSafetyRisks.pdf

[7] U.S. EPA STAR Grant: Engage, Educate and Empower California Communities on the Use and Applications of "Low-cost" Air Monitoring Sensors: http://www.aqmd.gov/aq-spec/research-projects

be summarized in a separate document and made available to the public soon. Also, CARB is conducting a Study of Neighborhood Air near Petroleum Sources (SNAPS)[8], and results will be used to inform AB 617 air monitoring activities.

In order to prioritize areas for initial monitoring the locations of all active and inactive oil wells within the WCWLB community were identified from the California Department of Conservation, the Division of Oil, Gas, and Geothermal Resources (DOGGR)[9] database. There are 7,823 oil and gas wells inside the WCWLB's community boundary, most of which (5770) are inactive and no longer being used. However inactive wells may also be a source of emissions due to unexpected leaks or ineffective plugging and abandonment. Figure 10 shows the location of the wells categorized by DOGGR as Active, Idle, or New.

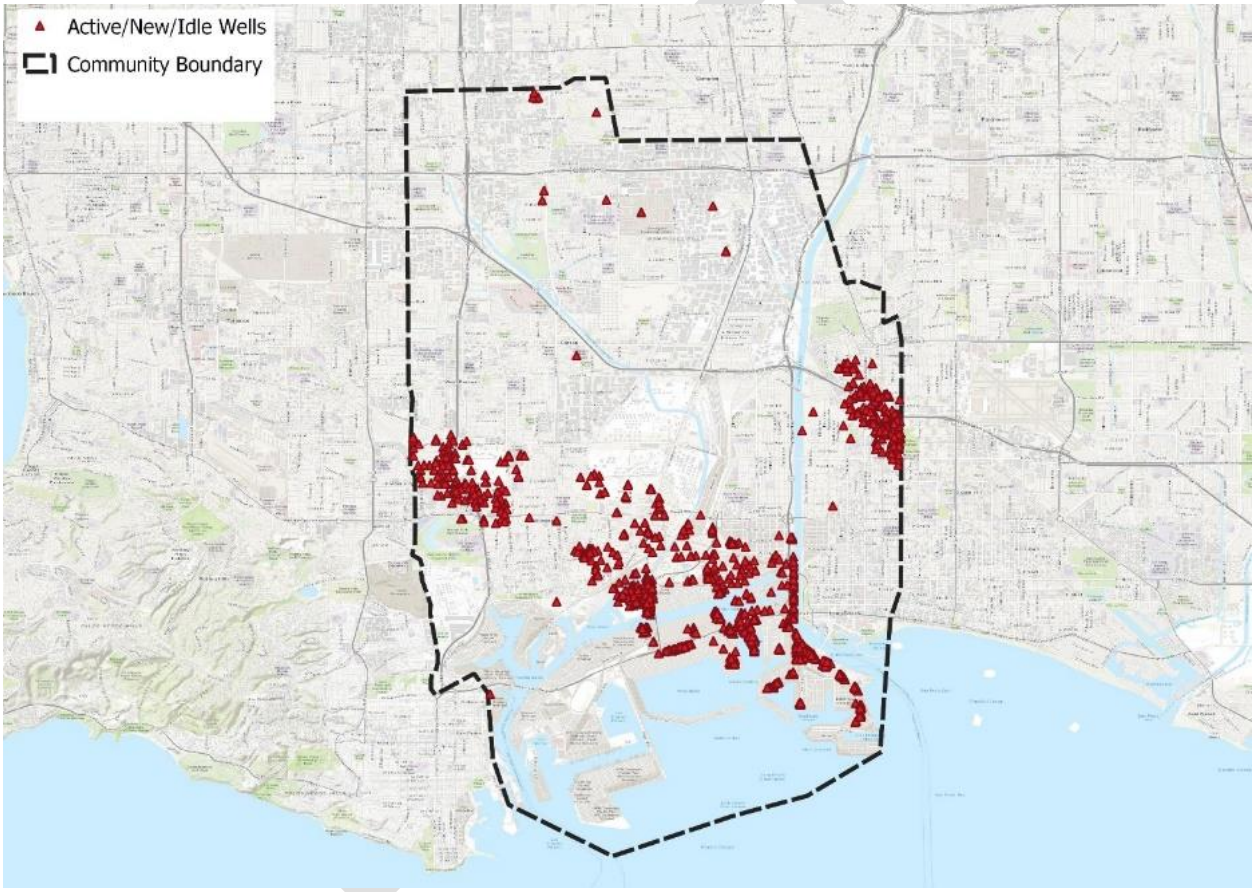

FIGURE 10 - LOCATION OF ACTIVE, IDLE, AND NEW WELLS WITHIN THE WCWLB COMMUNITY

Most of the wells in WCWLB are located within industrial areas, and away from residential communities. To consider the immediate impact of drilling activities on community exposure, AB 617 monitoring will focus on wells that are closer to the residential locations and areas most impacted by potential oil well emissions. Figure 11 shows a heat map of oil wells that are located less than half a mile away from a

[8] Study of Neighborhood Air near Petroleum Sources: https://ww2.arb.ca.gov/our-work/programs/study-neighborhood-air-near-petroleum-sources
[9] https://maps.conservation.ca.gov/oilgas/#dataviewer

residential area. A heat map uses a cool-to-warm color spectrum to show which areas contain the highest number of oil wells and, therefore, should receive the most attention. The dark red areas show the locations with the highest density of wells within half of a mile of residential areas.

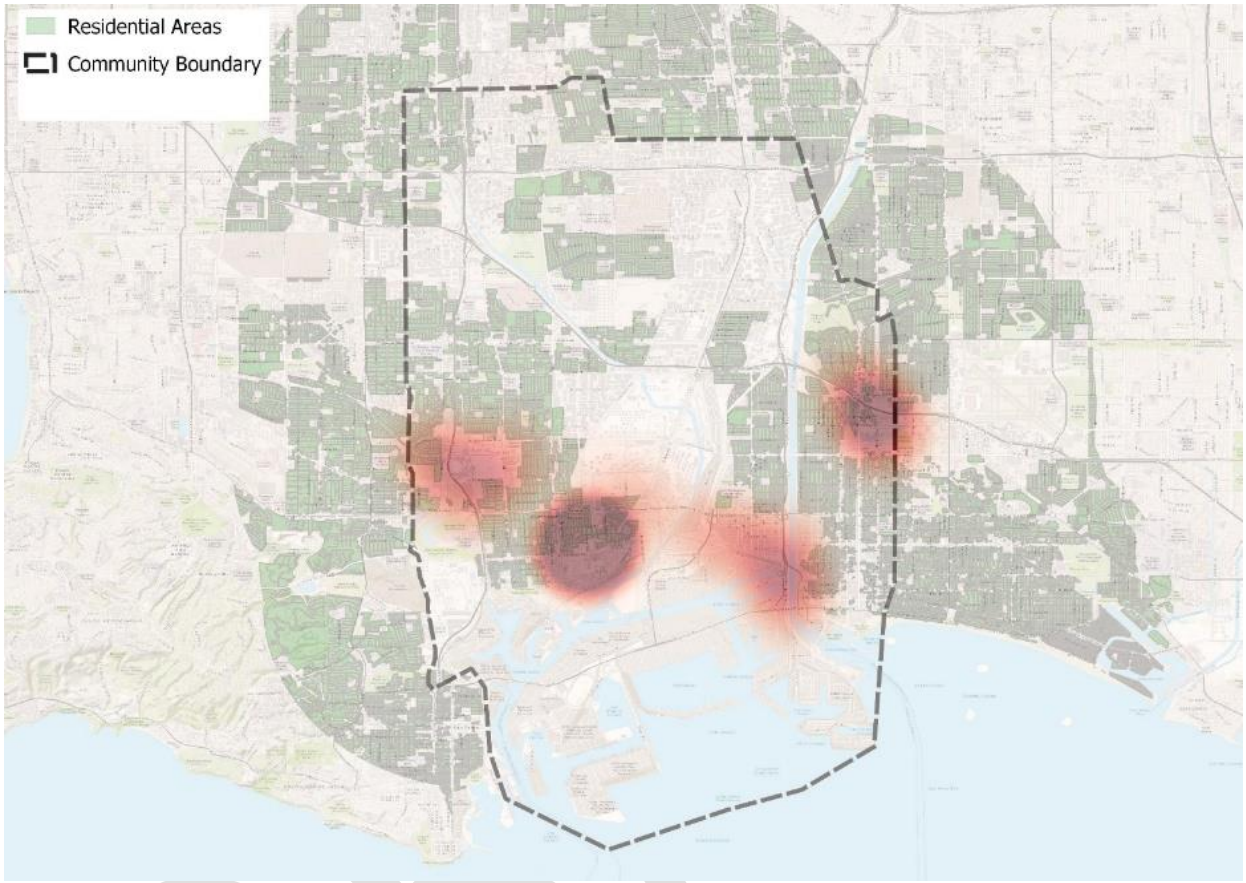

FIGURE 11 - HEAT MAP OF OIL/GAS WELLS WITHIN 0.5 MILE OF RESIDENTIAL AREAS

Based on an analysis of existing information and general wind patterns, South Coast AQMD staff has identified three sections where potential emissions from oil/gas production and drilling activities may have the highest impact on the WCWLB community (sections d, e and f in Figure 12).

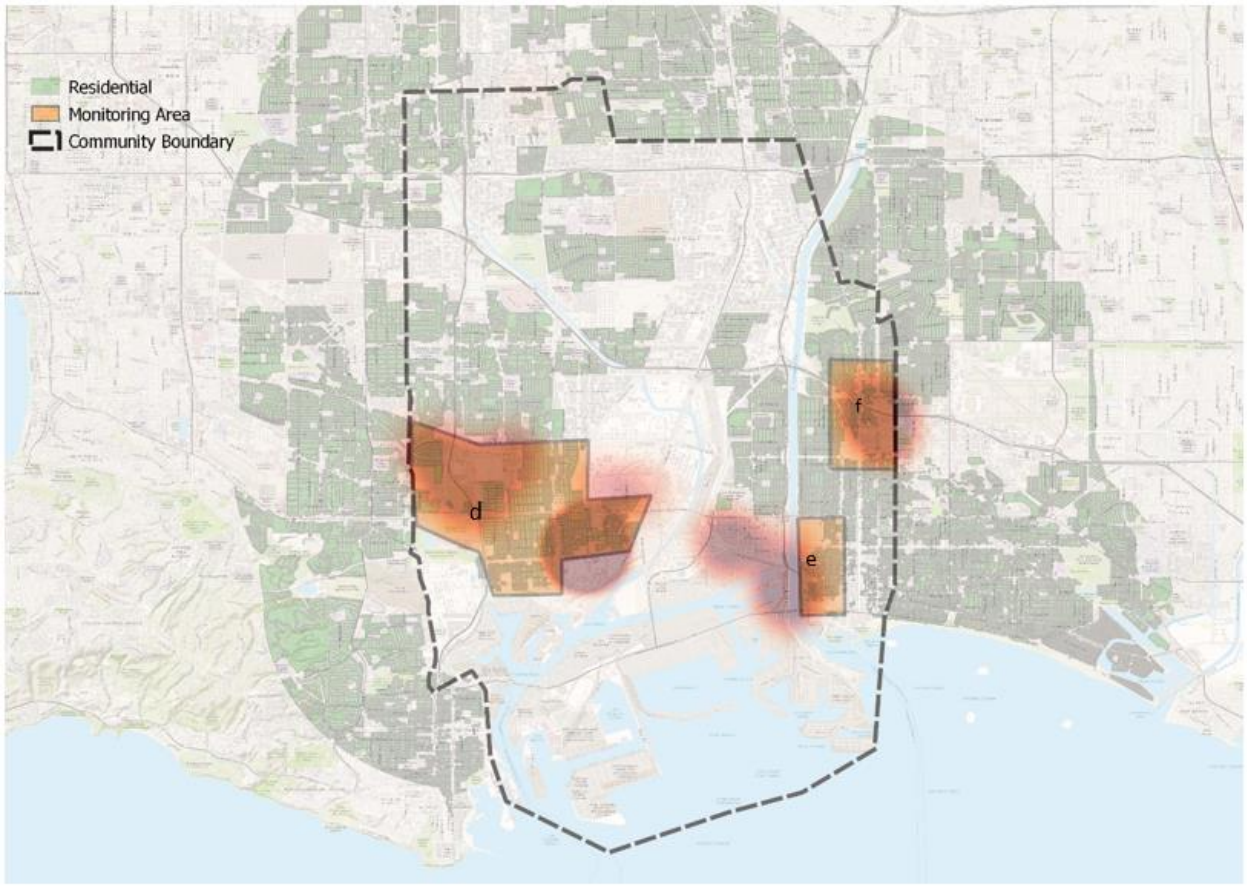

FIGURE 12 - PROPOSED MONITORING AREAS FOR OIL/GAS PRODUCTION AND DRILLING ACTIVITIES

Area d

This is a mixed residential and industrial area located between Wilmington and Harbor City (Figure 13). There are 421 wells including 296 active wells. This area is also likely to be impacted by emissions from wells outside of the WCWLB boundary, as well as by refinery emissions.

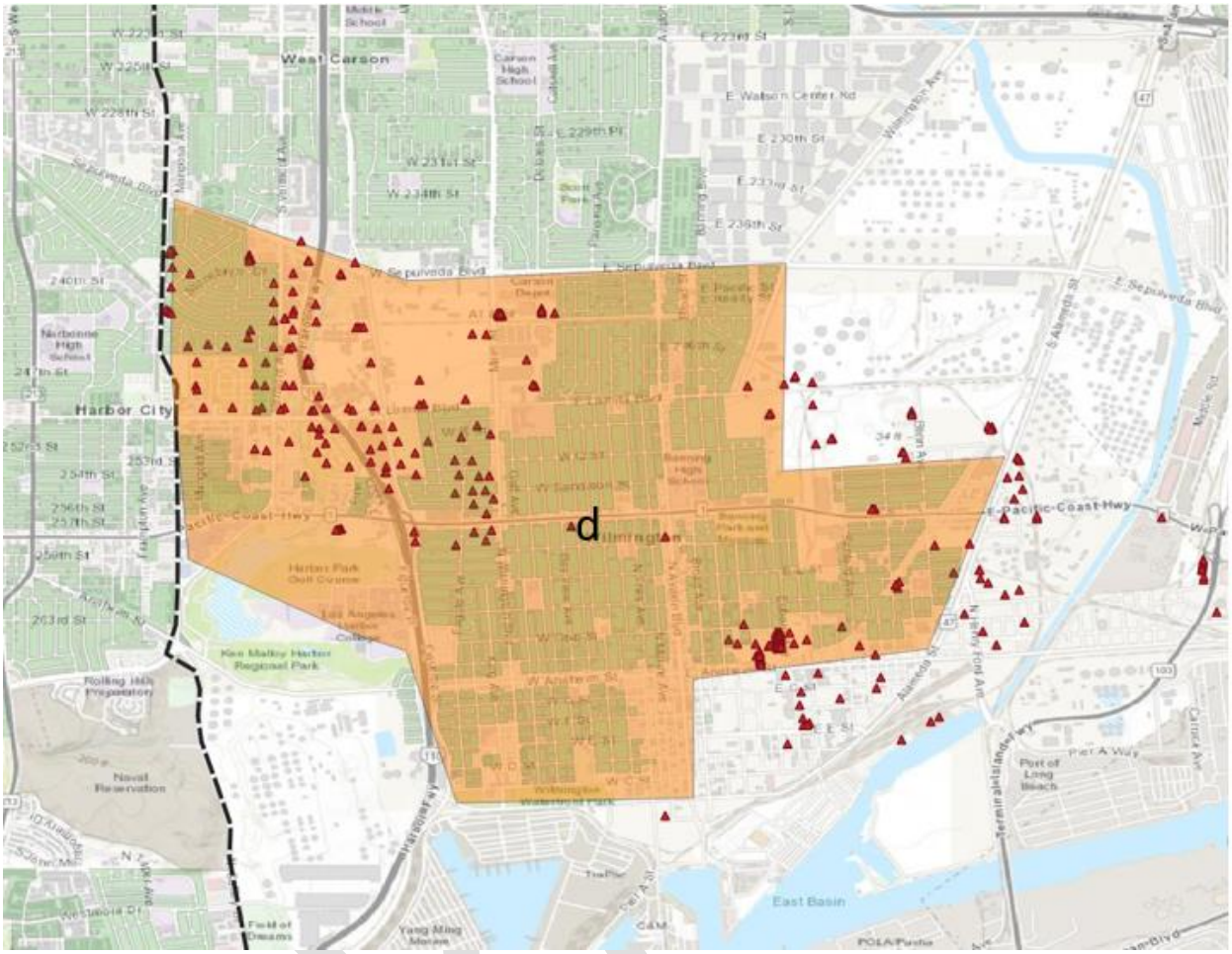

FIGURE 13 - PROPOSED AREA d WHERE MONITORING WILL FOCUS ON CHARACTERIZING FUGITIVE EMISSIONS AND LEAKS FROM OIL/GAS PRODUCTION AND DRILLING ACTIVITIES

Area e

This area is a mix of residential and commercial neighborhoods in the City of Long Beach near the Port of Long Beach. There are no oil wells within the area. However, there is a cluster of active wells on the west side of this community (Figure 14). Based on wind data provided by the Port of Long Beach Inner Port air quality station, area e is downwind of these wells about 33% of the time during a year (2017 data), when the wind is blowing between 210 and 330°.

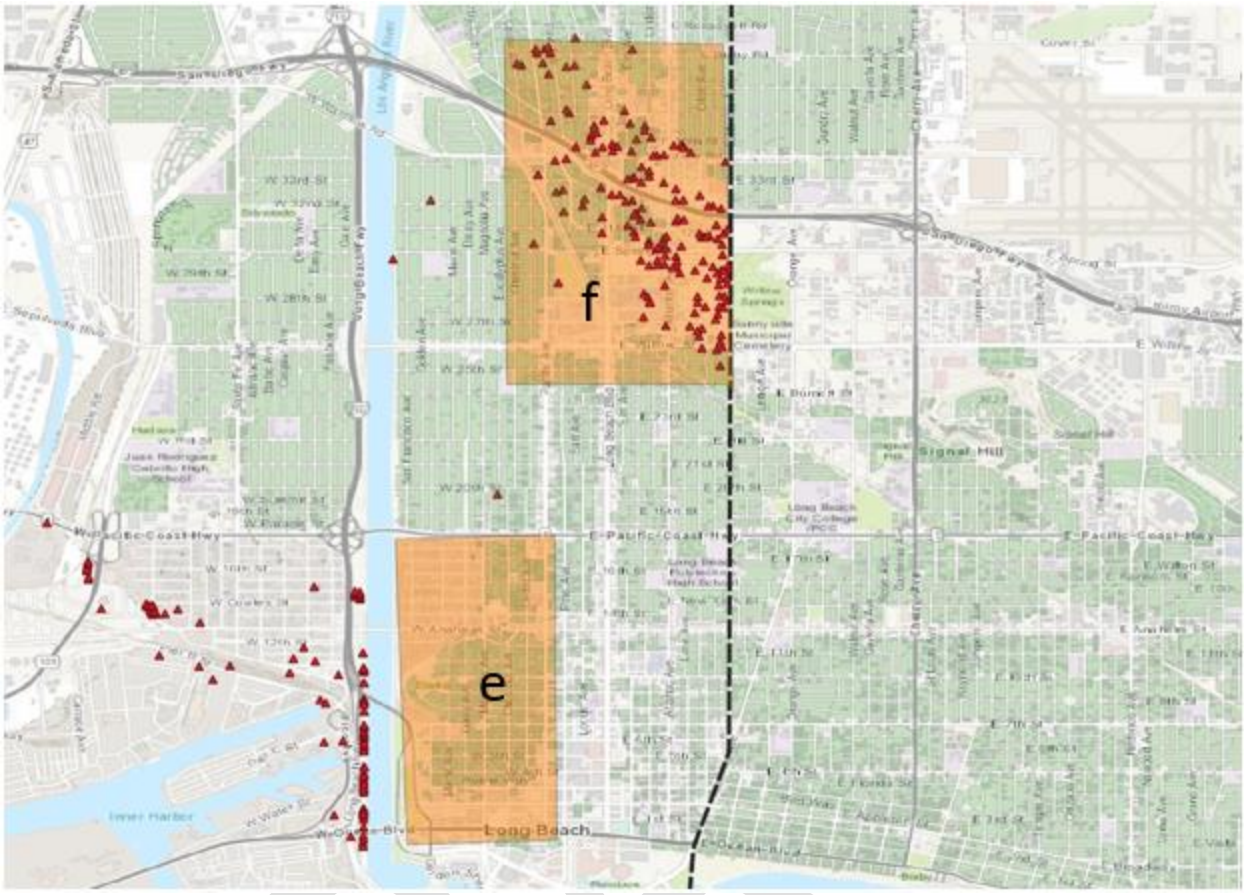

FIGURE 14 - PROPOSED AREAS *e* AND *f* WHERE MONITORING WILL FOCUS ON CHARACTERIZING FUGITIVE EMISSIONS AND LEAKS FROM OIL/GAS PRODUCTION AND DRILLING ACTIVITIES

Area f

This area is a mix of residential neighborhoods and industrial locations in the City of Long Beach. There are 168 wells including 76 active wells, some of which are within or in close proximity to residences.

In summary, the shaded sections labeled as “Monitoring Area” in Figure 14 are the highest priority areas for the purpose of this CAMP based on the number of oil and gas wells, their potential impact on nearby communities, and an analysis of the typical wind patterns in the region.

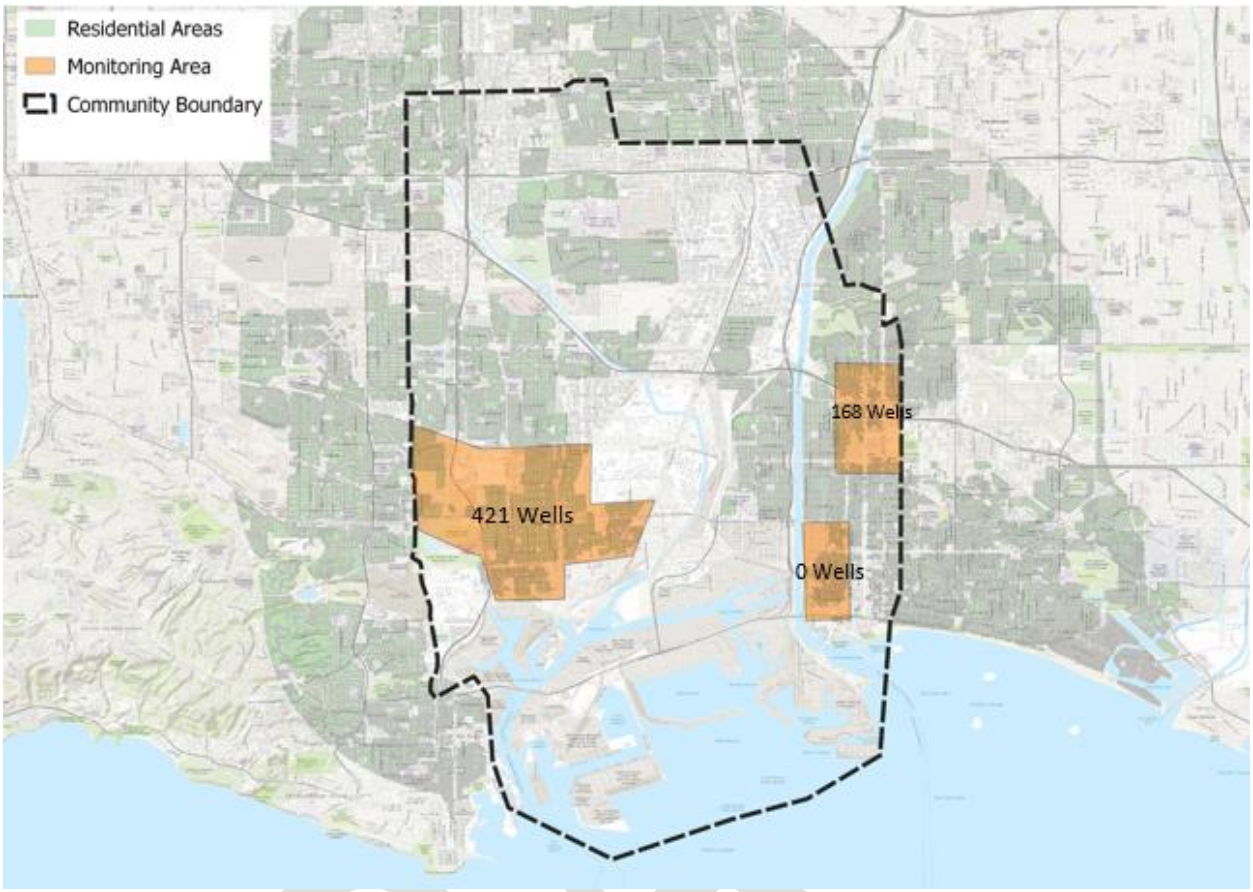

FIGURE 15 - PROPOSED AREAS WHERE MONITORING WILL FOCUS ON CHARACTERIZING FUGITIVE EMISSIONS AND LEAKS FROM OIL/GAS PRODUCTION AND DRILLING ACTIVITIES

Railyards

Along with refineries and oil drilling, railyards and related activities have been identified by the CSC as one of the main air quality concerns in the WCWLB community. Railyards are a complex mix of many source types including trains, stationary equipment, terminal operations, on-road vehicles and heavy duty diesel trucks. In this case, the major pollutants of concern are diesel PM and BC, VOCs and other air toxics including metals. While the railyards were identified as a high priority air quality concern by the CSC, some of the emissions related to railyard activities can occur due to train emissions along the railroads. Therefore, the proposed monitoring strategies also take into consideration all the railways in this community (Figure 16). Specifically, monitoring will be focused on determining source locations, emission profiles, and exposure variability. The strategy to better characterize this particular air quality concern will include fenceline monitoring at railyards to look at activities that may have the potential to increase levels of air pollution, and mobile and/or fixed monitoring near transportation corridors. Community monitoring will also be conducted to assess how railway/railyard emissions may contribute to the overall air pollution burden in this community. The pollutants that will be monitored include diesel PM markers, such as BC, NOx, PM mass and number concentrations, other relevant criteria pollutants, such as metals and other air toxics.

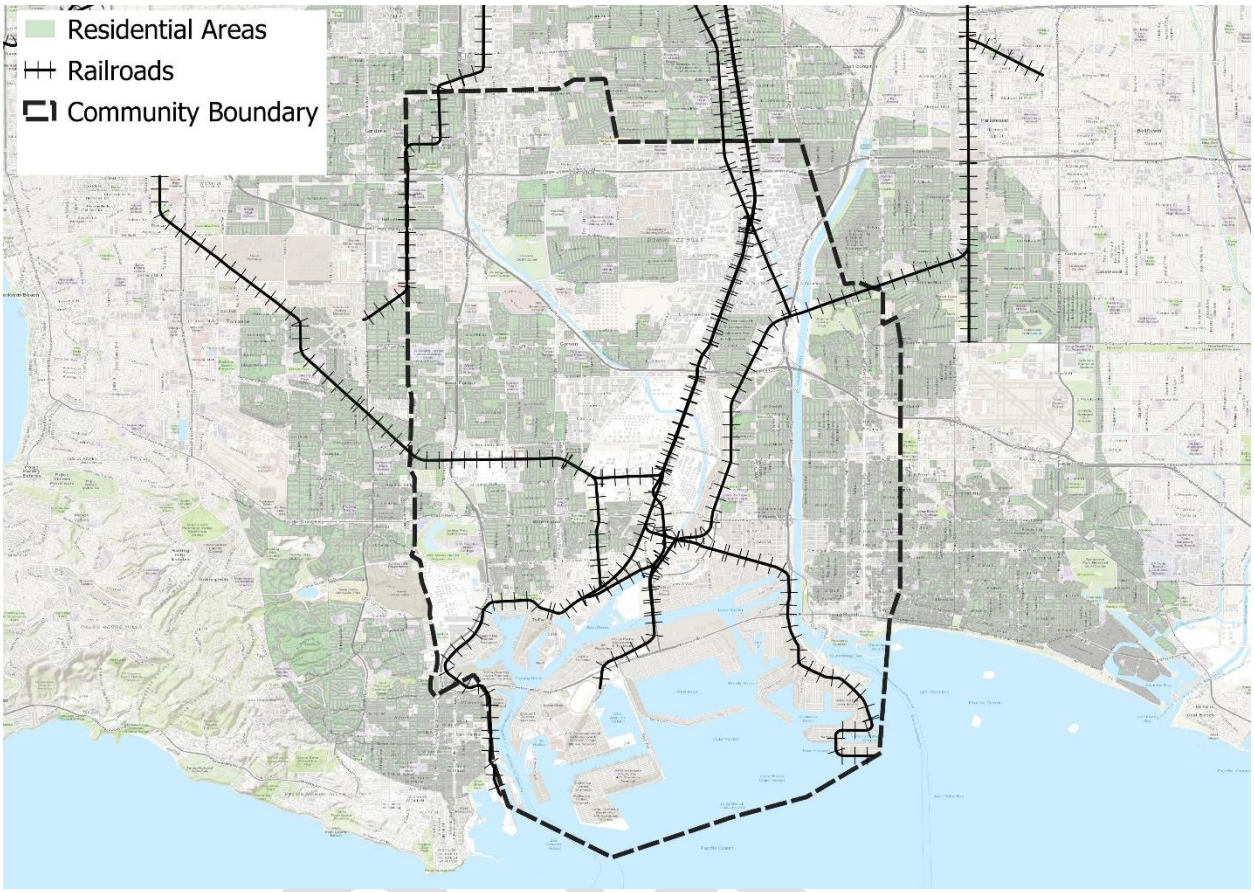

FIGURE 16 - RAILWAYS INCLUDED WITHIN THE WCWLB COMMUNITY

Based on information gathered from the California Department of Transportation, four areas were identified as the most impacted by potential emissions from railways and railyards (Figure 16).

Areas g and h

Areas g and h are a mix of residential, commercial, and industrial neighborhoods located in Wilmington (Areas g and h) and Carson (Area g only) (Figure 17).

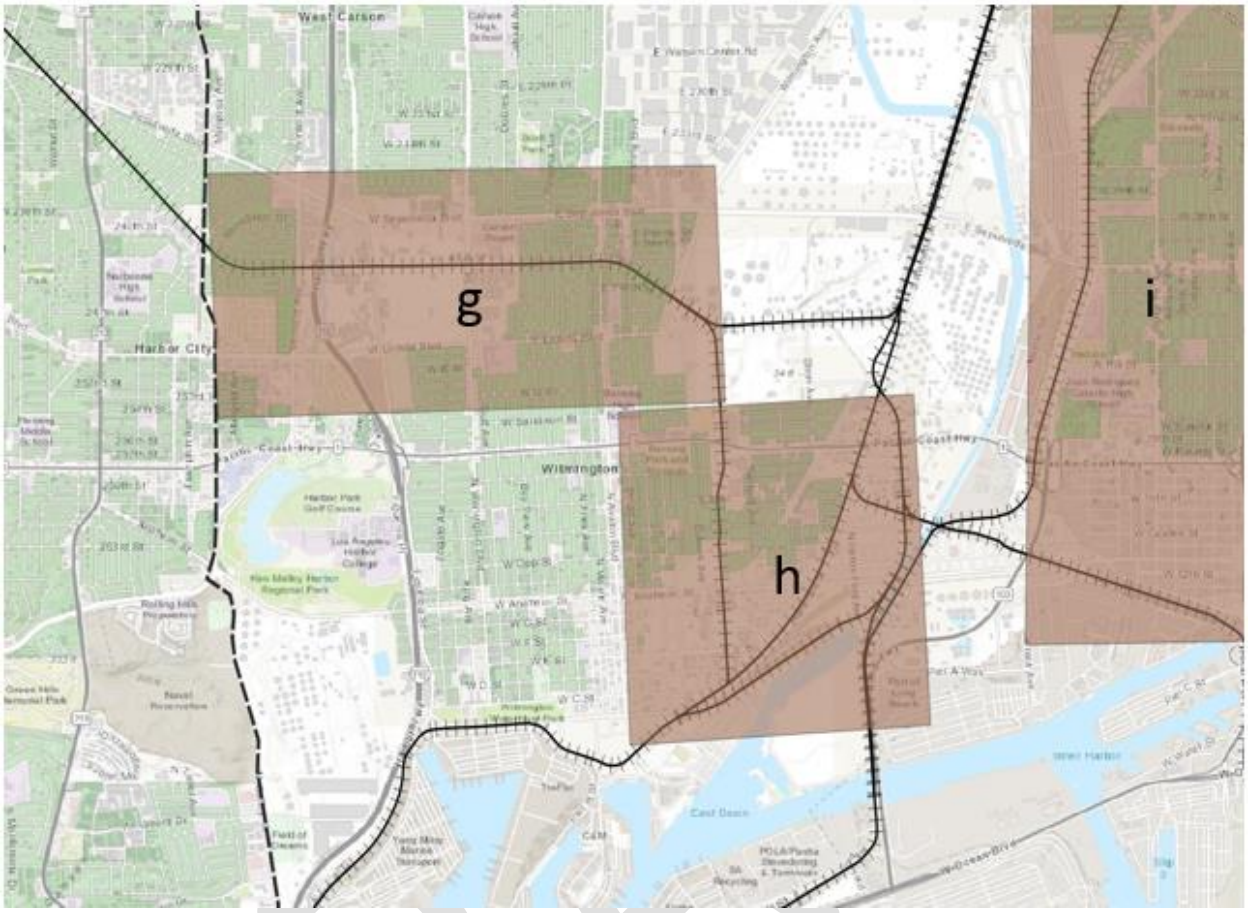

FIGURE 17 - PROPOSED MONITORING AREAS g AND h FOR RAILROADS

Area i

Area i is a mix of residential, commercial, and industrial neighborhoods located in Long Beach (Figure 18). Area i includes the Union Pacific Intermodal Container Transfer Facility (UP ICTF) and Dolores Railyards.

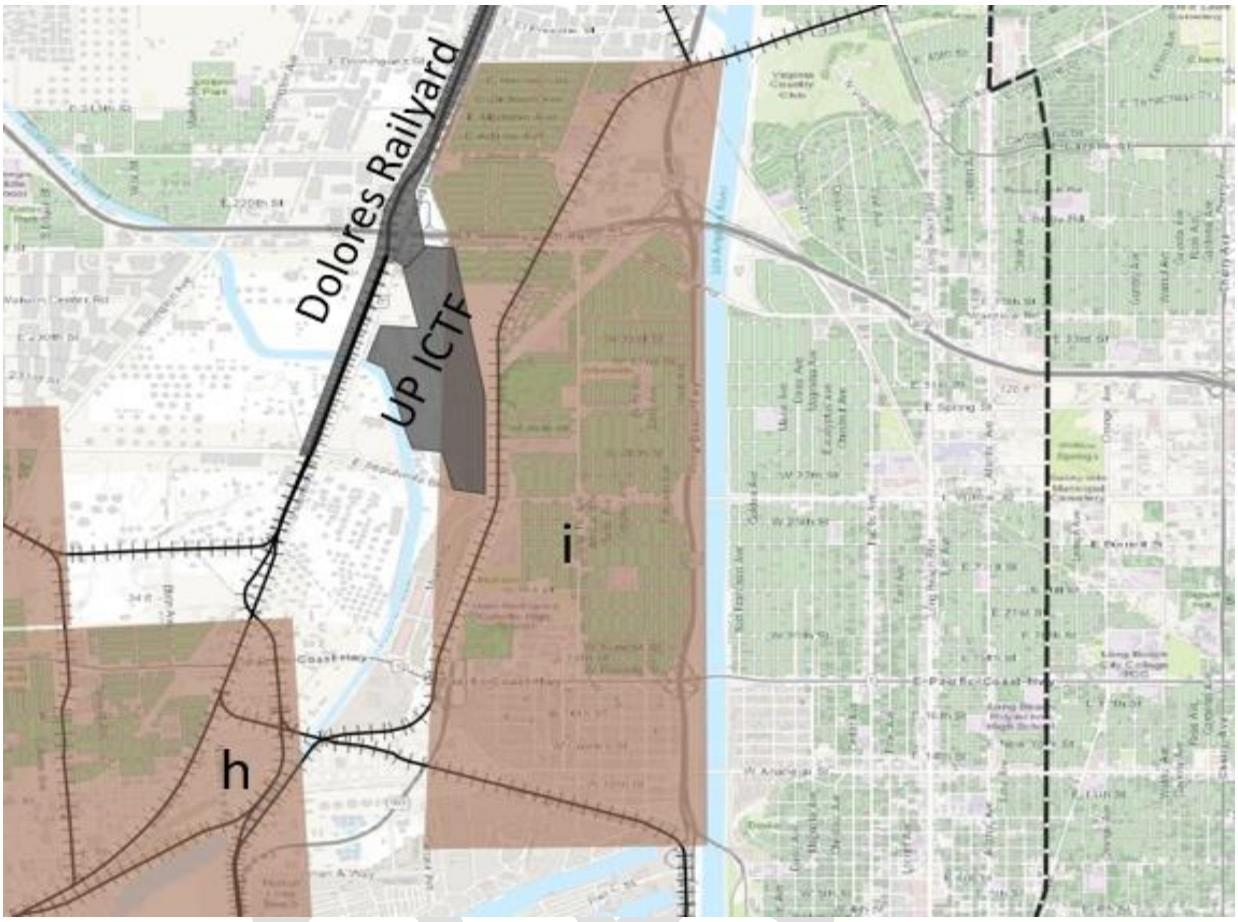

FIGURE 18 - PROPOSED MONITORING AREAS i AND h FOR RAILROADS

The shaded sections labeled as "Monitoring Area" in Figure 19 are the highest priority areas considered for monitoring purposes based on the proximity of railways and railyards to residential areas and sensitive receptors, and also considering general wind patterns. These will be prioritized for the purposes of monitoring, although air quality measurements will extend to other areas in the WCWLB community.

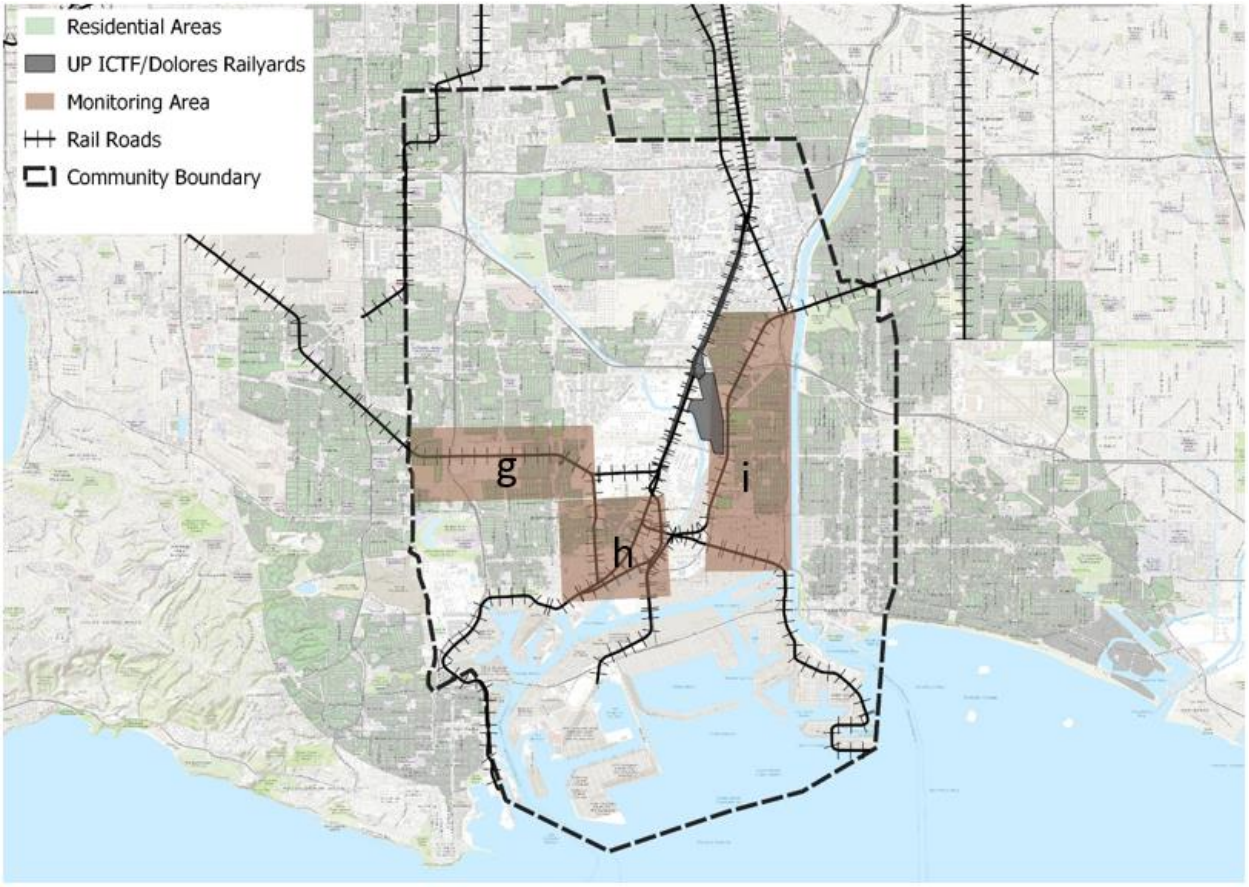

FIGURE 19 - RAILWAYS AND SELECTED MONITORING AREAS

Sensitive Receptors

Hospitals, schools, and other sensitive receptors were also identified as high priority air quality concern by the CSC members. As defined in South Coast AQMD's Rule 1470(b)(60) a sensitive receptor "means any residence including private homes, condominiums, apartments, and living quarters, schools as defined under paragraph (b)(57) [of the same rule], preschools, daycare centers and health facilities such as hospitals or retirement and nursing homes. A sensitive receptor includes long term care hospitals, hospices, prisons, and dormitories or similar live-in housing."

Prioritizations and monitoring activities are developed considering the location of sensitive receptors. Some of the major factors for this consideration include identification of potential emission sources impacting sensitive receptors, the type and amount of pollutants emitted and their toxicity, the distance from emission sources, and predominant wind patterns to identify the downwind and upwind receptors. The location of schools, medical centers, and child care facilities, including those identified by the CSC are shown in Figure 20.

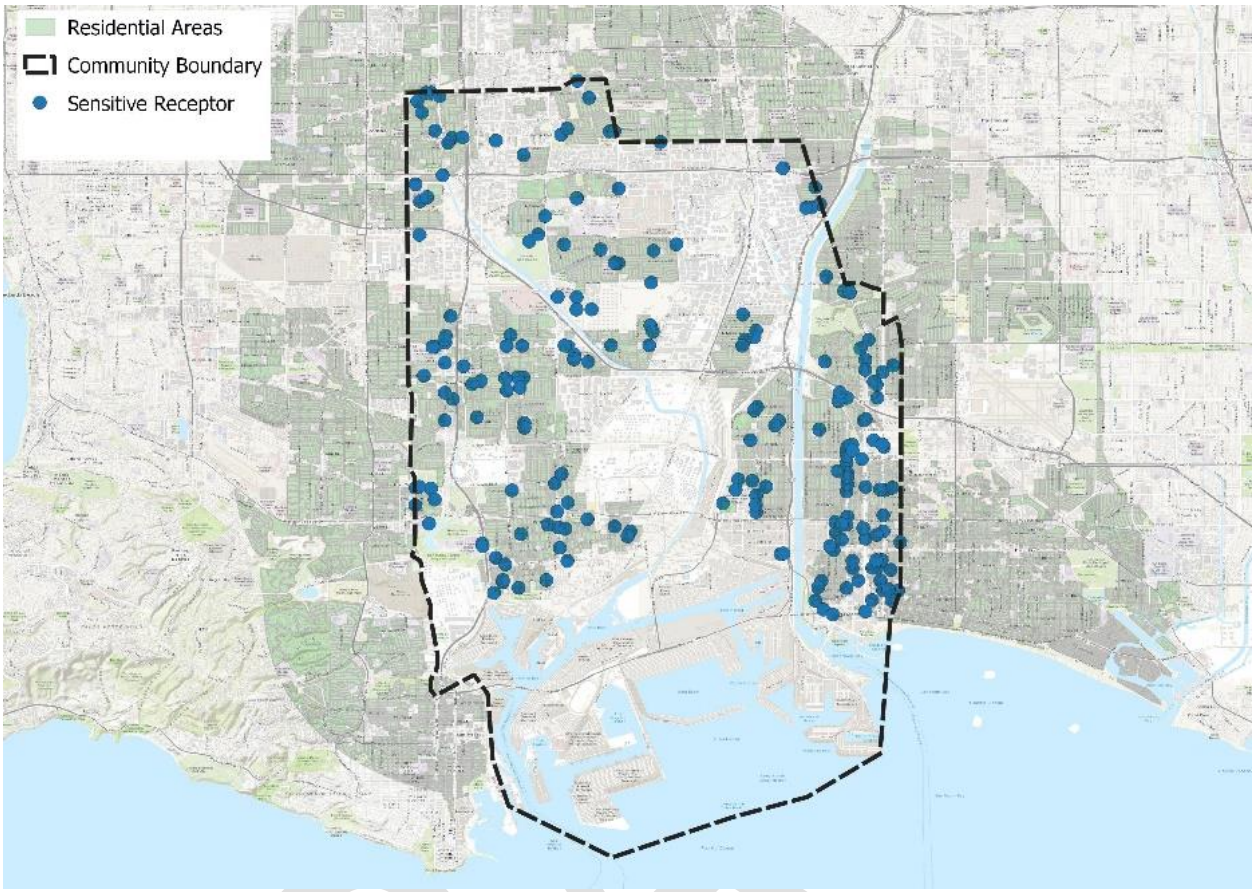

FIGURE 20 - LOCATION OF SCHOOLS, MEDICAL CENTERS, CHILD CARE FACILITIES

Monitoring activities and strategies to better characterize potential impacts on sensitive receptors in the WCWLB community include, but are not limited to, mobile measurements at and near sensitive receptors (e.g. schools), as well as near the sources of emissions in vicinity of those receptors. Fixed monitoring can also be conducted in areas with well-defined air pollution sources that have an impact on the community. The location of future fixed monitoring will be determined in consultation with the CSC and considering (among other factors) the locations of sensitive receptors. The mobile and fixed monitoring may be augmented by sensor deployments at selected schools, if appropriate. As part of MATES V, the South Coast AQMD is collaborating with a contractor (Aclima) on developing a sensor network in the WCWLB community. The sensors will measure PM mass, NO, CO, and in some select locations, total VOC concentrations (the details of this effort is provided in the CAMP). Most of the sensor locations are being determined at the time of this writing. Arrangements have been made for sensor deployments at a number of locations including schools in Wilmington and Carson. The preliminary list of surveyed schools for sensor deployments are:

1. Broadacres Avenue Elementary School (19424 Broadacres Ave., Carson, CA 90746)
2. Dominguez Elementary School (21250 S Santa Fe Ave, Carson, CA 90810)
3. Curtiss Middle School (1254 E Helmick St, Carson, CA 90746)
4. Carson Street Elementary School (161 E Carson St, Carson, CA 90745)

5. Hawaiian Avenue Elementary (540 Hawaiian Ave., Wilmington, CA 90744)
6. George De La Torre Elementary School (500 Island Ave., Wilmington, CA 90744)
7. Fries Avenue Elementary School (1301 N Fries Ave., Wilmington, CA 90744)
8. Wilmington Park Elementary School (1140 Mahar Ave., Wilmington, CA 90744)
9. Banning High School (1527 Lake Ave., Wilmington, CA 90744)
10. Wilmington Middle School (1700 Gulf Ave., Wilmington, CA 90744)
11. Gulf Elementary School (828 W. L St., Wilmington, CA 90744)
12. Harry Bridges Span School (1235 Broad Ave., Wilmington, CA 90744)

To complement the sensor network, being developed as part of MATES V, additional air quality sensors will be deployed in the WCWLB community as part of AB 617.