

The logo for CTEH, featuring the letters 'CTEH' in a bold, white, sans-serif font with a registered trademark symbol (®) to the upper right. The text is set against a dark blue rectangular background.

CTEH[®]

THE SCIENCE OF READYSM

VALERO ENERGY

BENICIA REFINERY PARTICULATE

RELEASE

Benicia, CA

March 15, 2019

Project #111342

1.0 Introduction

On March 13, 2019 Valero Energy requested that CTEH® conduct air monitoring in the surrounding community after a release of particulate matter from the Benicia Refinery in Benicia California. CTEH® arrived on-site on March 13, 2019 and began air monitoring operations. Activities were comprised of real-time air monitoring and analytical air sampling.

This report summarizes air monitoring data collected from March 14, 2019 06:30 PDT to March 15, 2019 06:30 PDT.

2.0 Air Monitoring and Sampling Methods

CTEH® developed and implemented an air sampling and analysis work plan (SAP) to document and quantify the release of fugitive emissions from the flue gas scrubber. All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Target analytes were measured as benzene, carbon monoxide (CO), nitrogen dioxide (NO₂), 2.5-micron particulate matter (PM_{2.5}), 10-micron particulate matter (PM₁₀), sulfur dioxide (SO₂), toluene, and xylene using handheld instruments such as RAE Systems MultiRAEs, TSI SidePak™ AM510/AM520 Aerosol Monitors, and Gastec GV-100 pumps with chemical-specific colorimetric detection tubes.

Hand-held air monitoring consisted of roaming air monitoring in the surrounding community. All hand-held air monitoring was conducted in the breathing zone.

Analytical air samples were deployed in the breathing zone at six locations through the community. Each station consisted of SKC active sampling pump equipped with mixed cellulose ester (MCE) filter media suitable for collection of metals.

All samples will be sent to an accredited laboratory for analysis in accordance with NIOSH Method 7303. **Figure 11 in Attachment A** depicts these analytical air sampling locations.

3.0 Air Monitoring Results

Figures 1 – 10 in Attachment A depicts the site location and hand-held monitoring locations for this reporting period.

Table 1 summarizes the results for community hand-held air monitoring readings.

Table 1: Community Hand-Held Real-Time Air Monitoring Results

Analyte	Instrument	# Readings	# Detections	Range
Benzene	Gastec #121L	8	0	< 0.05 ppm
Carbon Monoxide	MultiRAE	74	0	< 1 ppm
NO ₂	MultiRAE	76	0	< 0.1 ppm
PM ₁₀	AM510/AM520	76	66	0.002 - 0.08 mg/m3
PM _{2.5}	AM510/AM520	71	61	0.002 - 0.021 mg/m3
SO ₂	MultiRAE	76	0	< 0.1 ppm
Toluene	Gastec #122L	9	0	< 0.5 ppm
Xylene	Gastec #123L	9	0	< 1 ppm

¹Maximum detections preceded by the "<" symbol are considered non-detections below the limit of detection (LoD) value to the right.

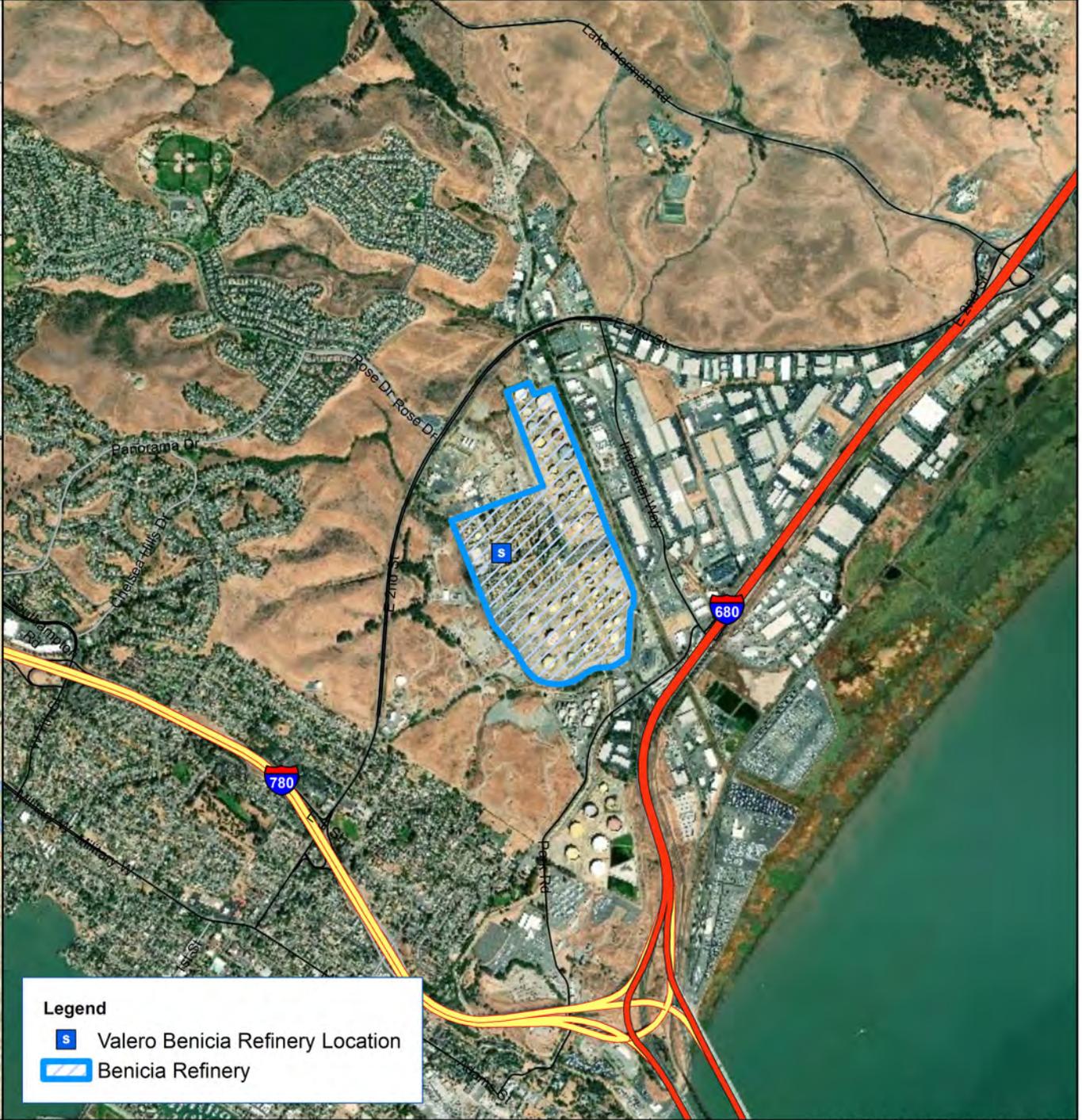
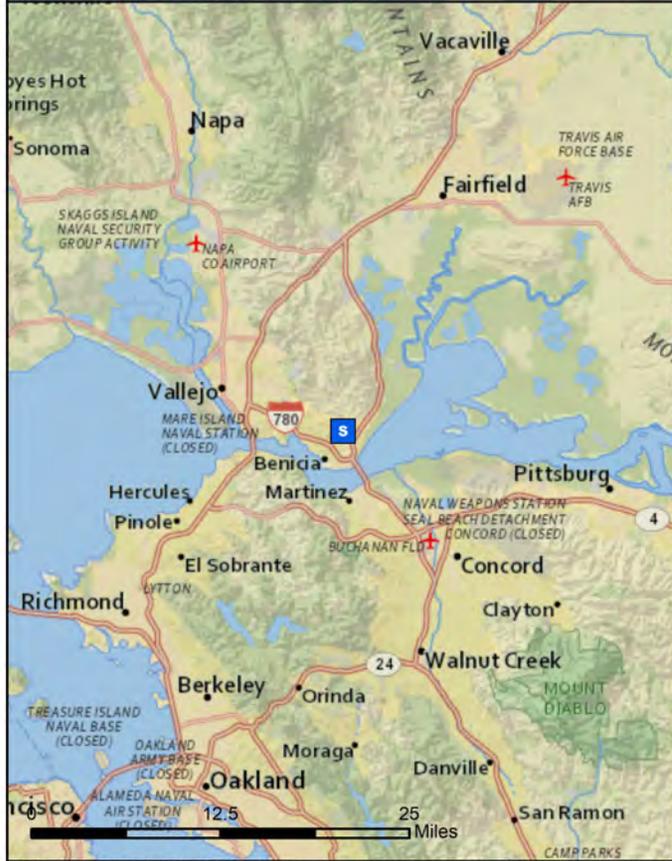
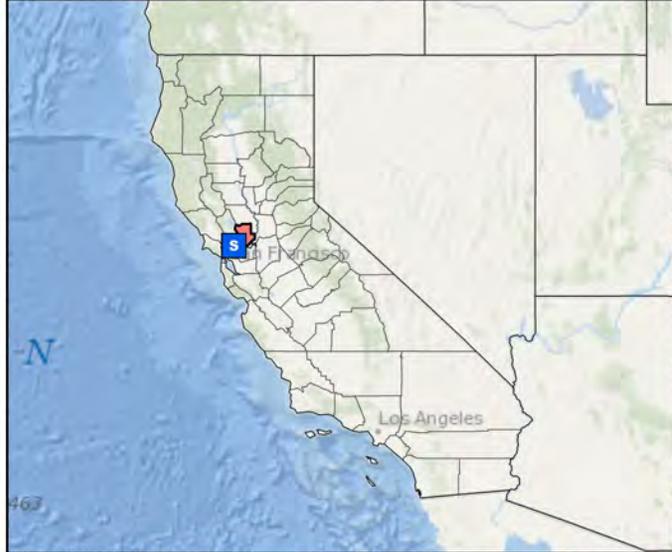
4.0 Weather Conditions

Figure 12 in attachment B contains a wind rose depicting wind speed and direction for this reporting period. Data was acquired from California Irrigation Management System (CIMIS) meteorological station #170 located in Concord to the southeast of the Benicia Refinery.



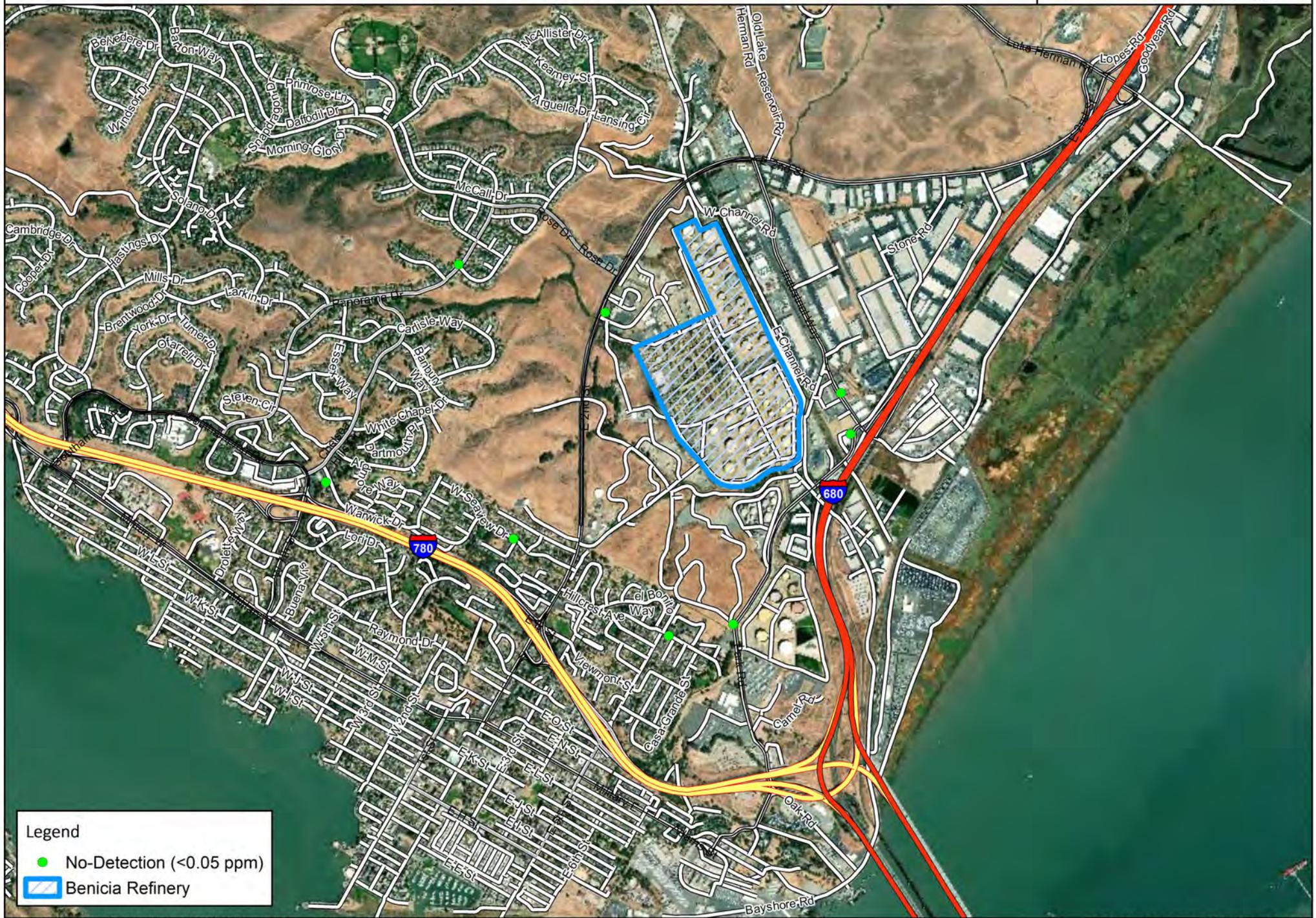
Attachment A

CTEH Air Sampling and Monitoring Locations



Legend

- Valero Benicia Refinery Location
- Benicia Refinery



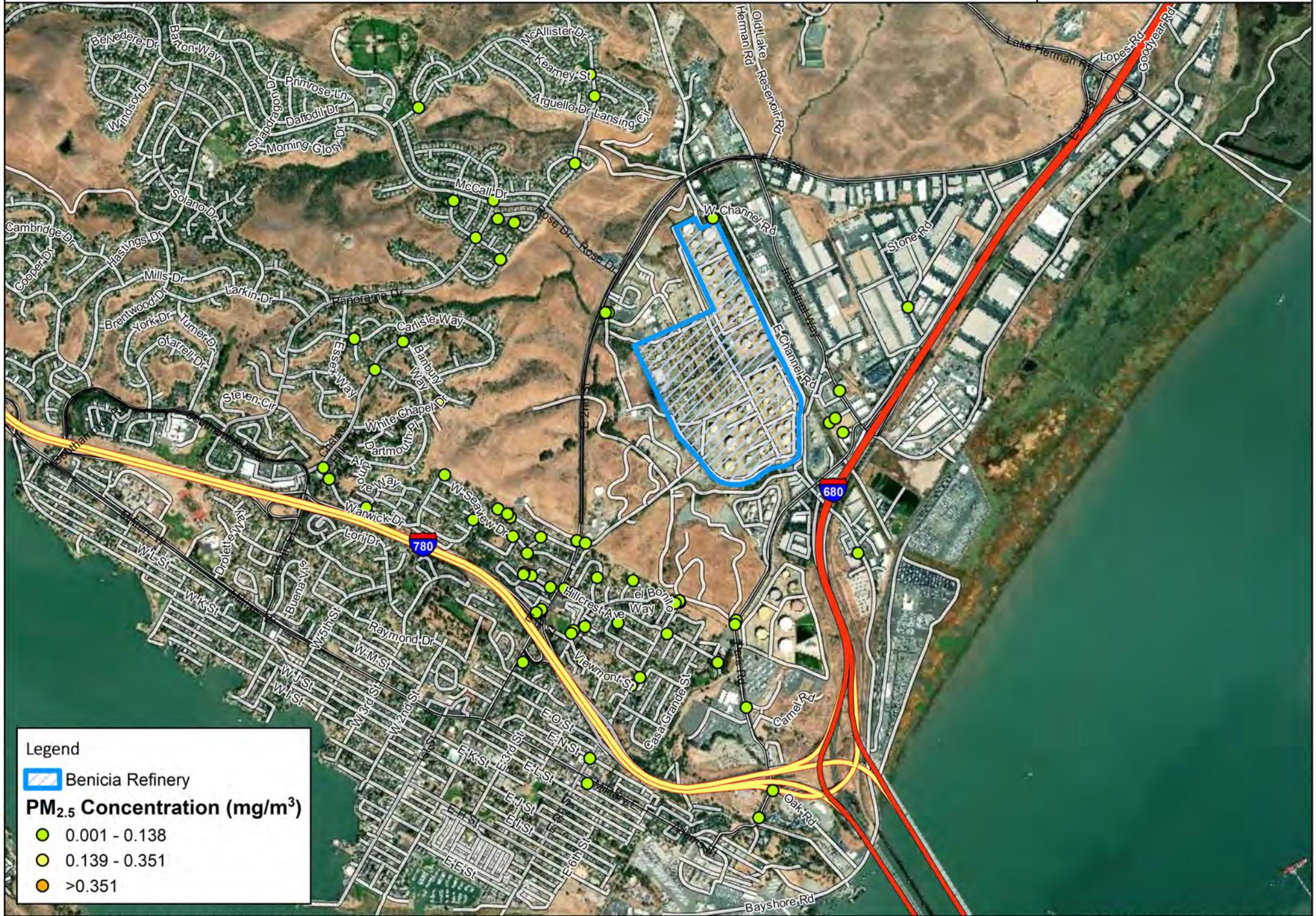
Legend

- No-Detection (<0.05 ppm)
- ▭ Benicia Refinery



Legend

-  Benicia Refinery
- PM₁₀ Concentration (mg/m³)**
-  0.001 - 0.138
-  0.139 - 0.351
-  >0.352

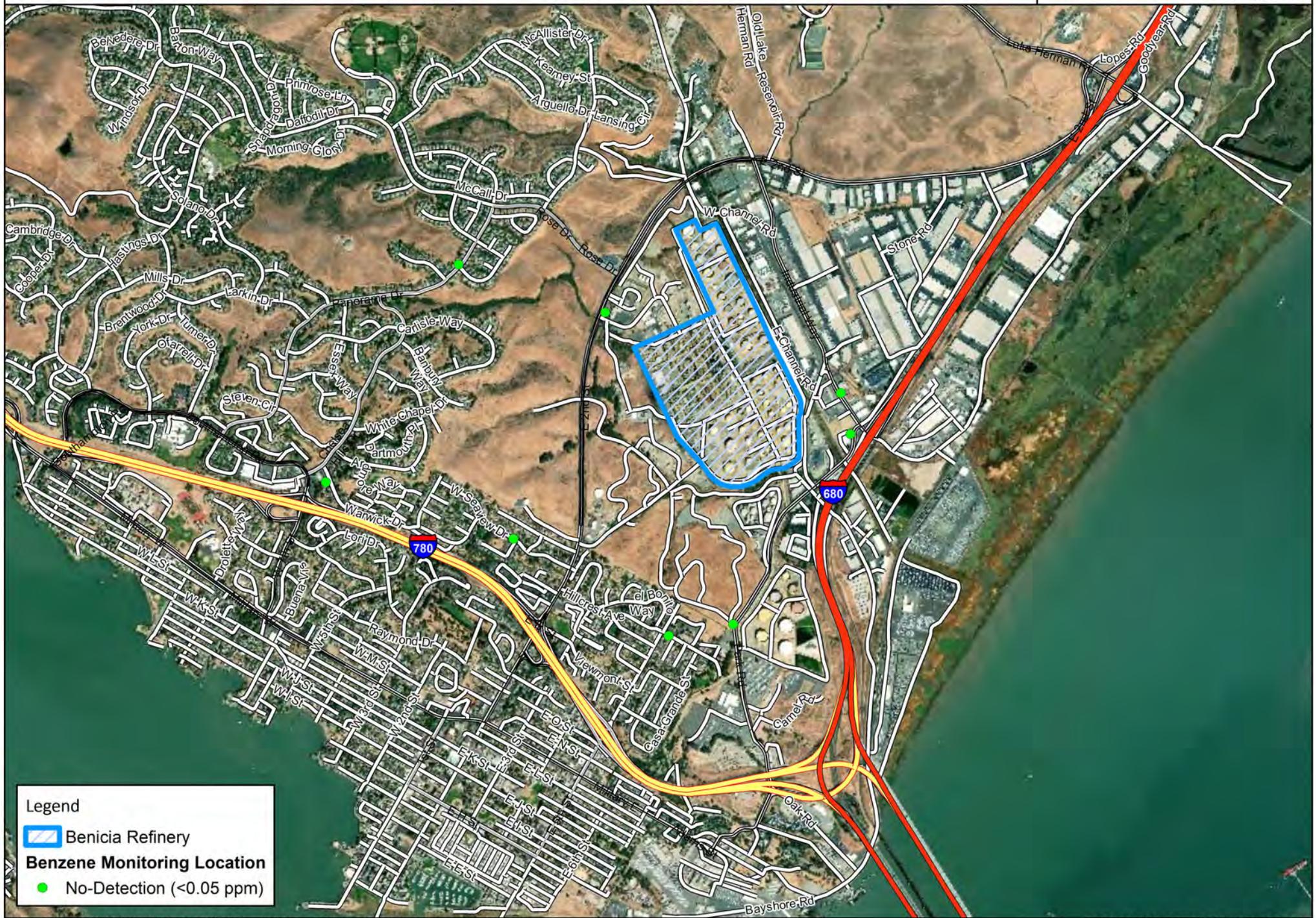


Legend

- Benicia Refinery

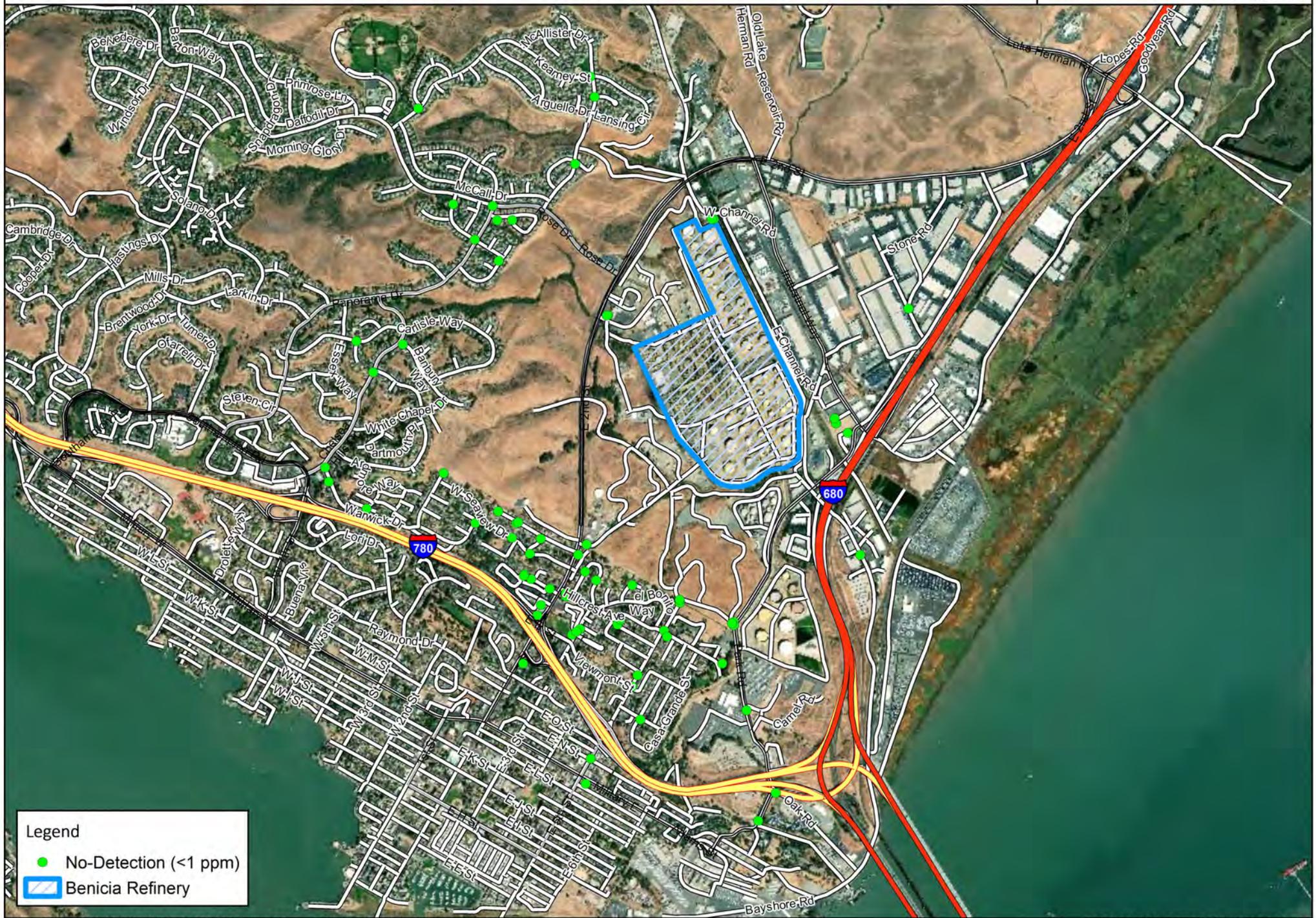
PM_{2.5} Concentration (mg/m³)

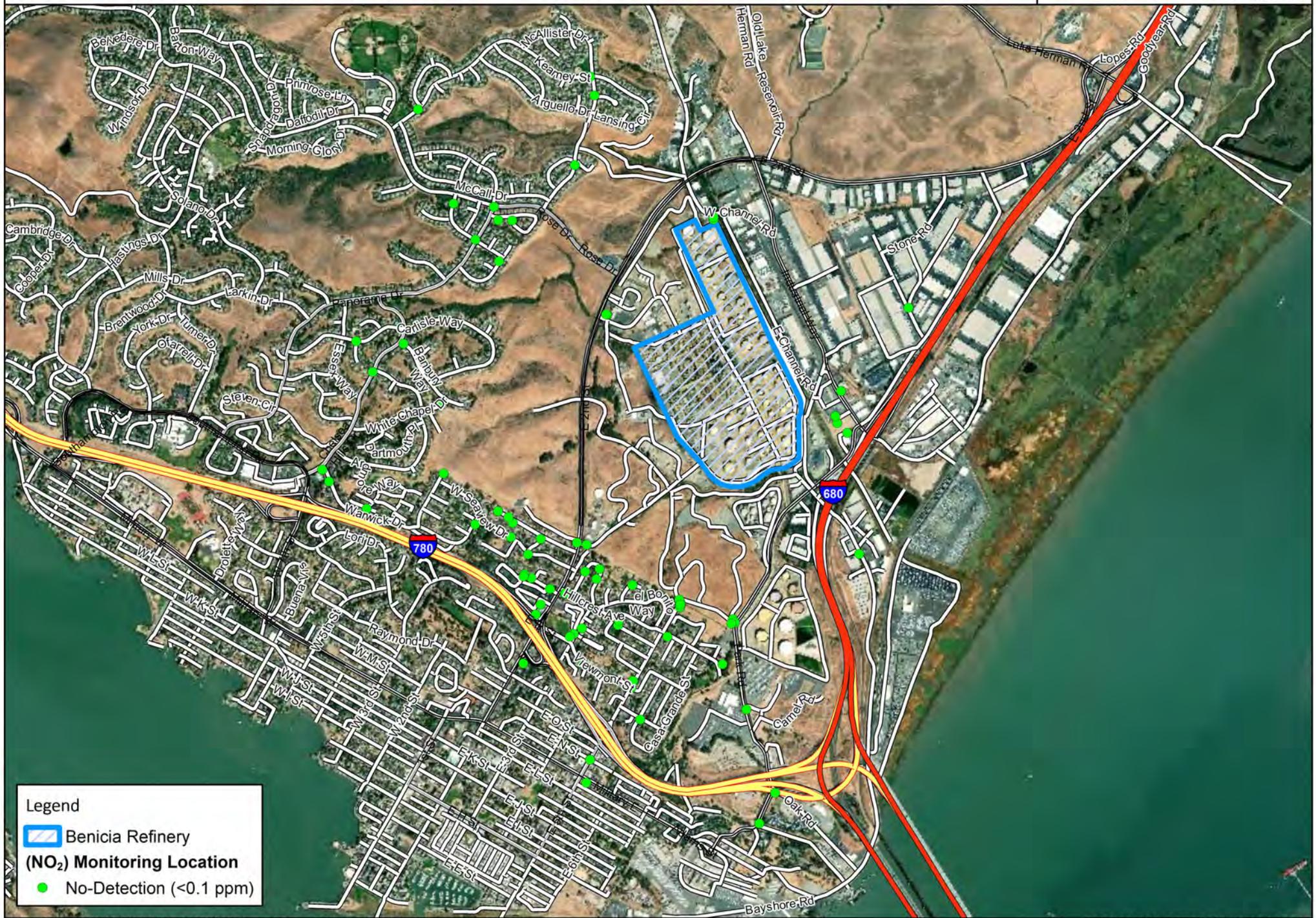
- 0.001 - 0.138
- 0.139 - 0.351
- >0.351

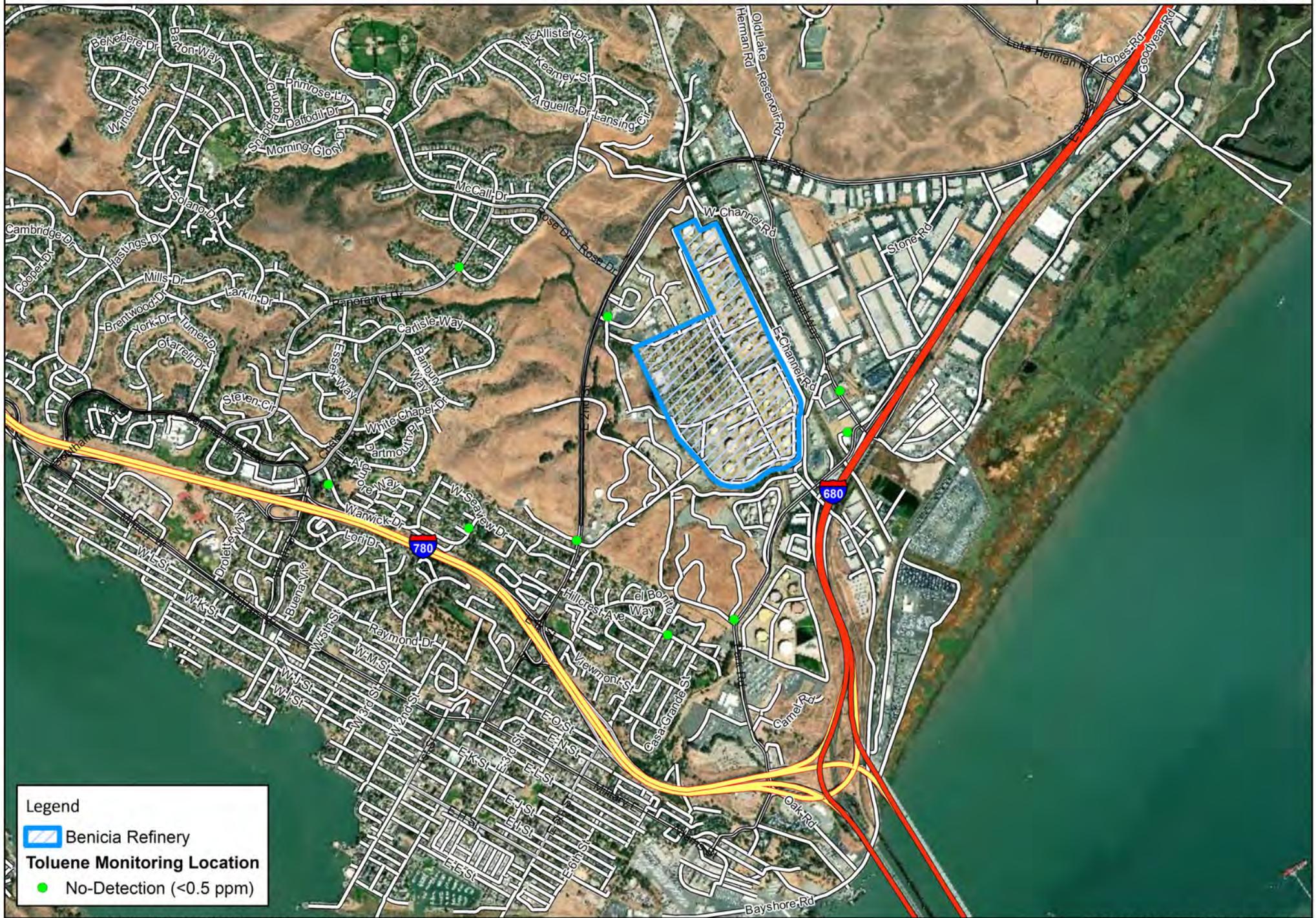


Legend

- Benicia Refinery
- Benzene Monitoring Location**
- No-Detection (<0.05 ppm)

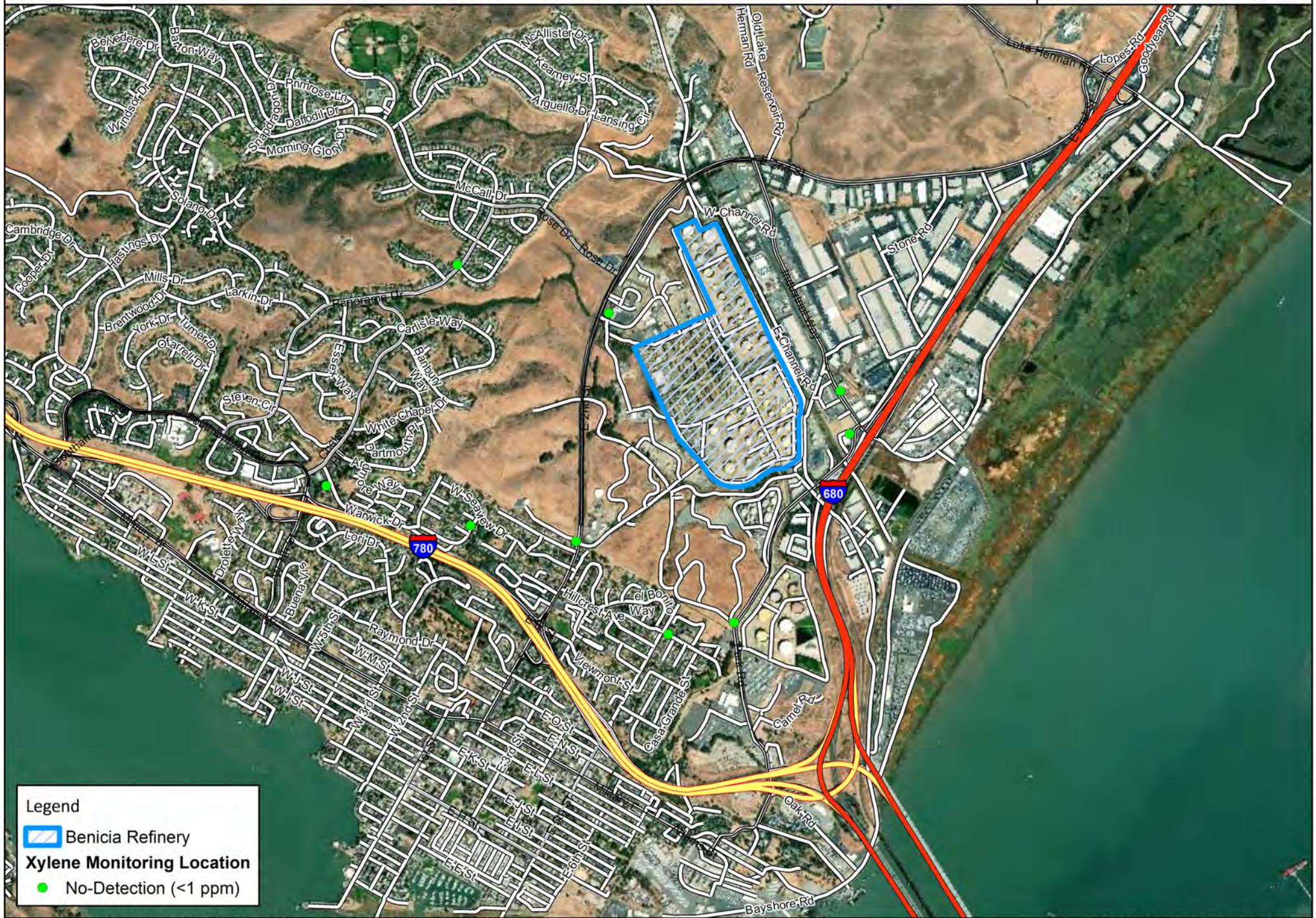






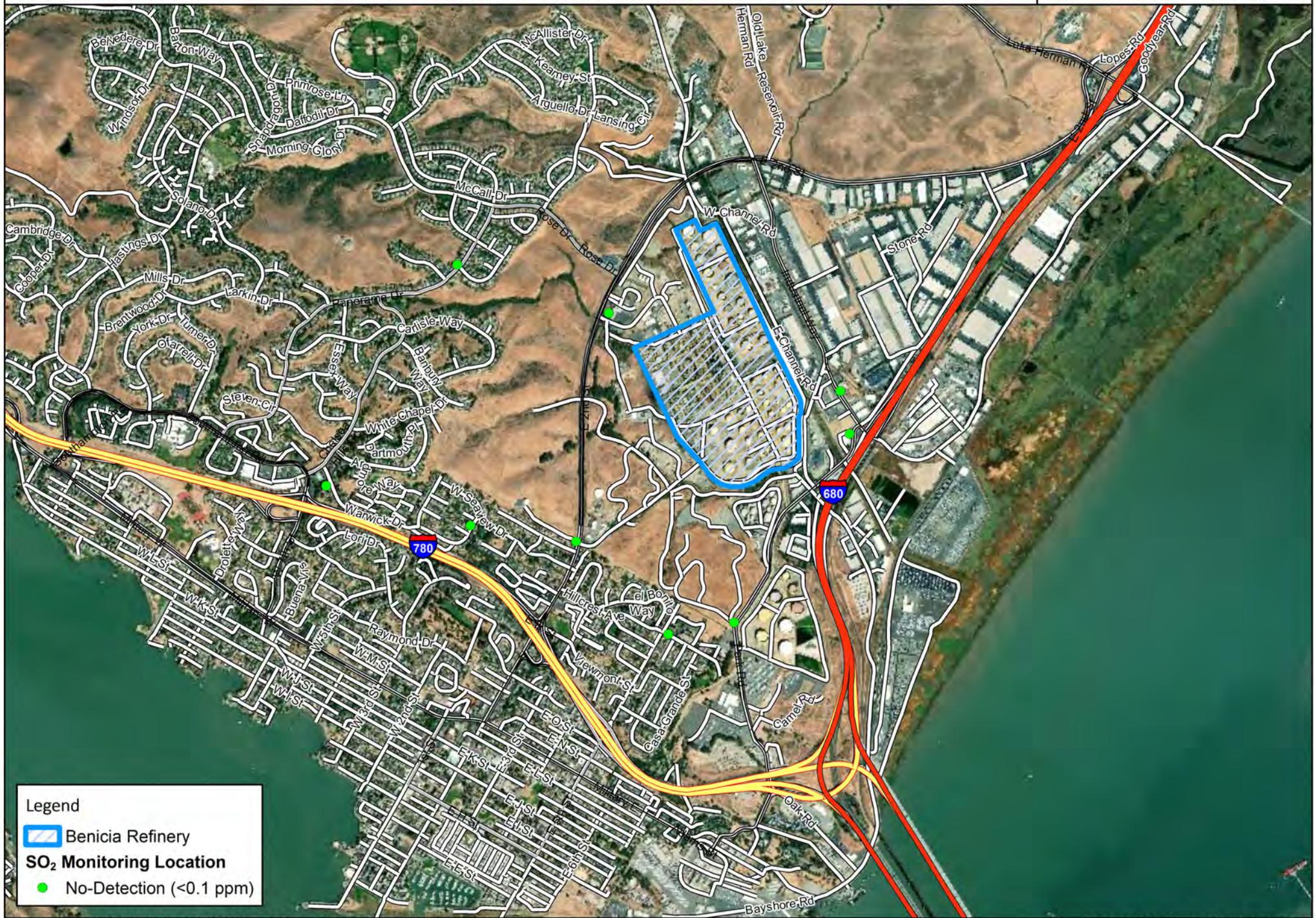
Legend

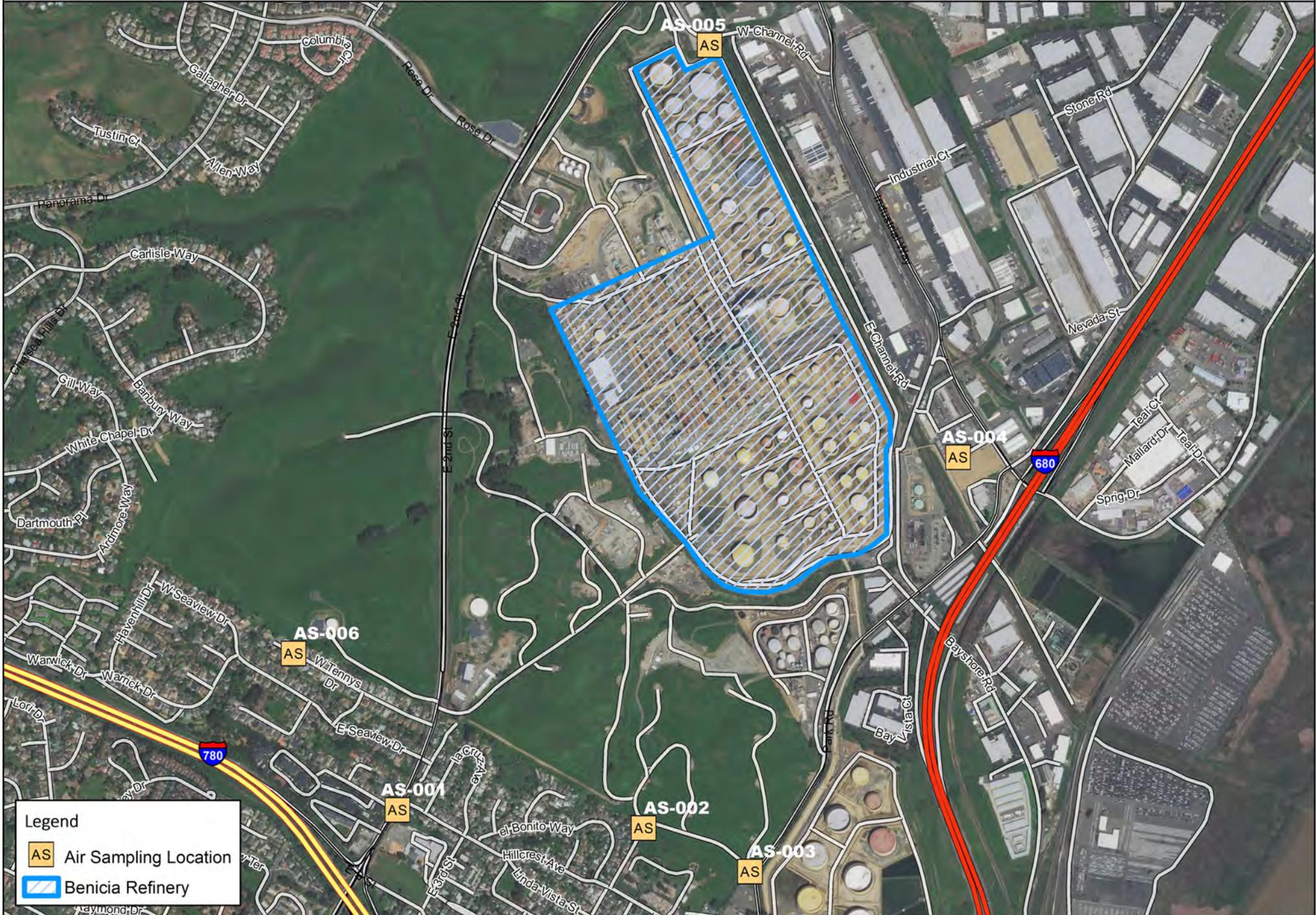
- Benicia Refinery
- Toluene Monitoring Location
- No-Detection (<0.5 ppm)



Legend

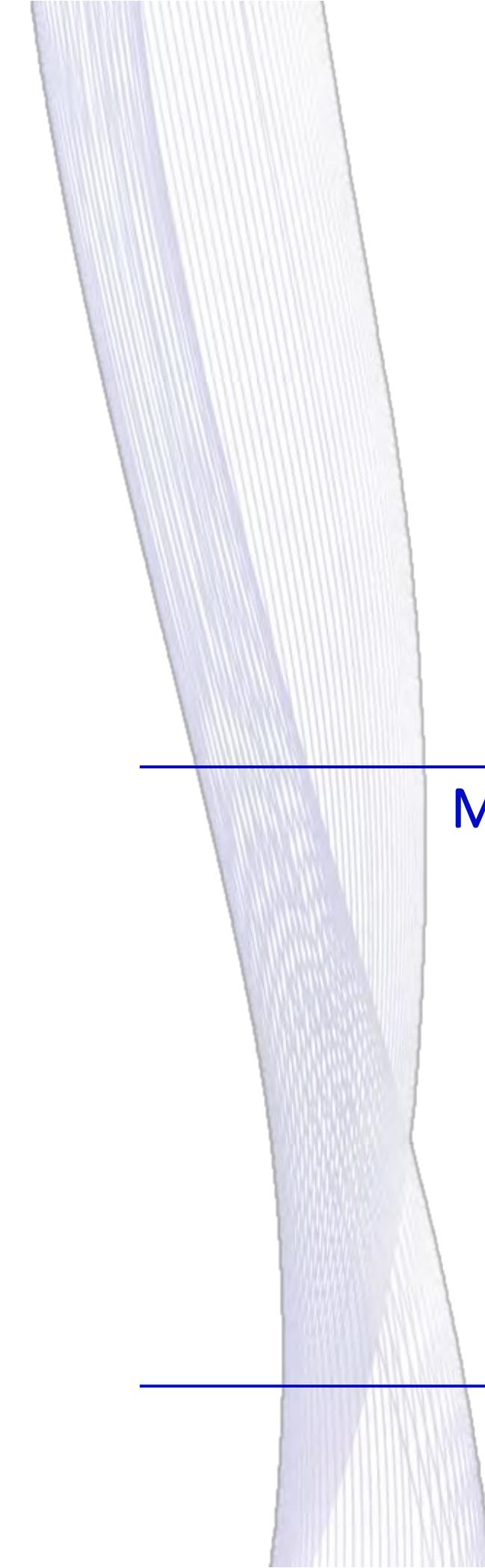
- Benicia Refinery
- Xylene Monitoring Location
- No-Detection (<1 ppm)





Legend

- Air Sampling Location
- Benicia Refinery

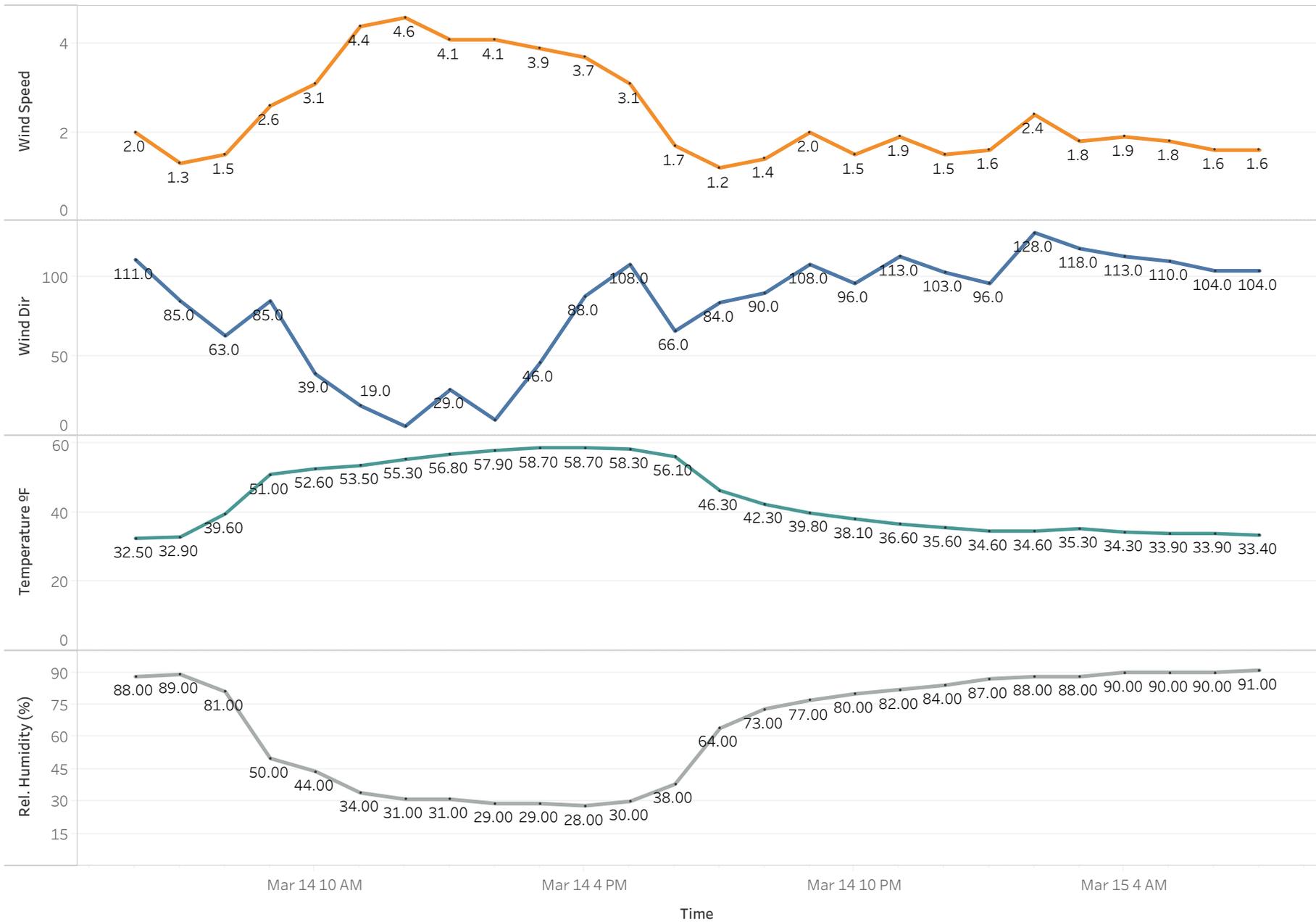


Attachment B

Meteorological Conditions

Figure 12: CIMIS Concord Meteorological Conditions

Mar 14 06:00 - Mar 15 07:00

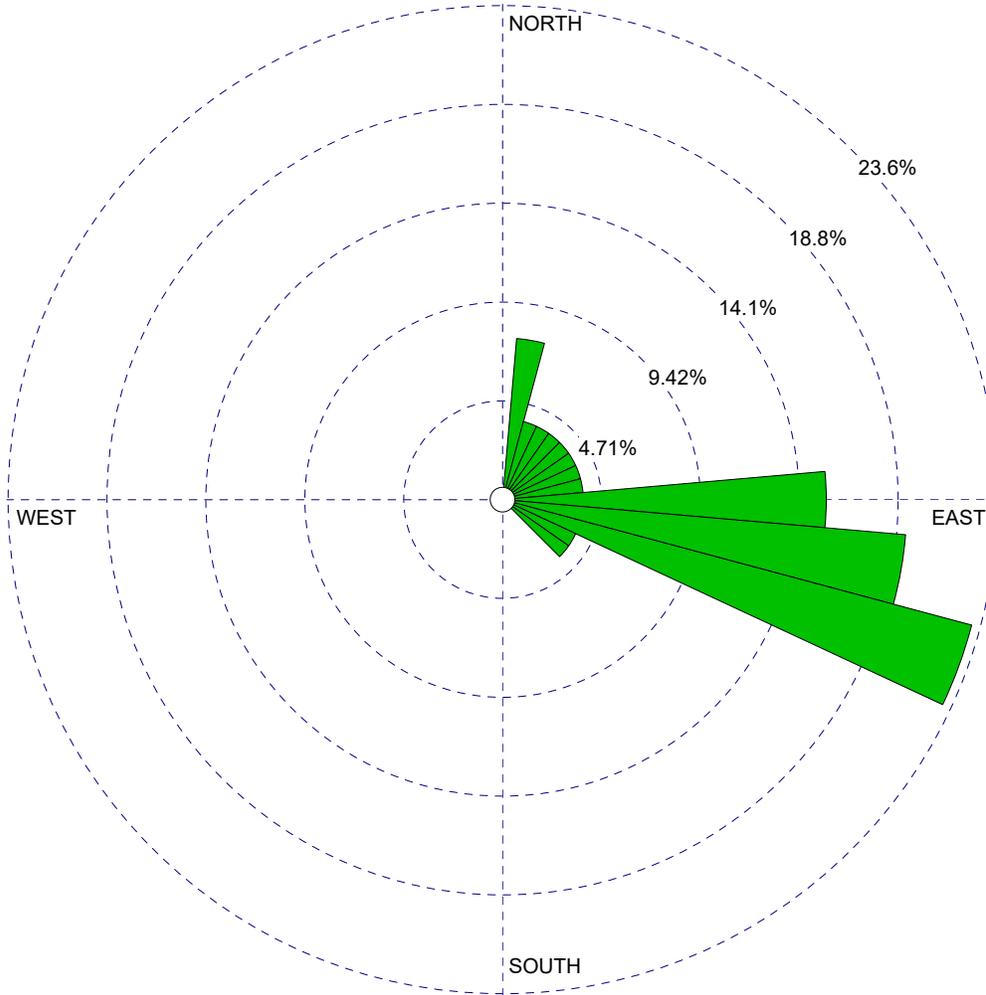


WIND ROSE PLOT:

Station #CIMIS

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(Knots)

- >= 21.58
- 17.11 - 21.58
- 11.08 - 17.11
- 7.00 - 11.08
- 4.08 - 7.00
- 0.97 - 4.08

Calms: 0.00%

COMMENTS:

DATA PERIOD:

Start Date: 3/14/2019 - 06:00
End Date: 3/15/2019 - 07:00

COMPANY NAME:

MODELER:

CALM WINDS:

0.00%

TOTAL COUNT:

26 hrs.

AVG. WIND SPEED:

2.08 Knots

DATE:

3/15/2019

PROJECT NO.:

111342