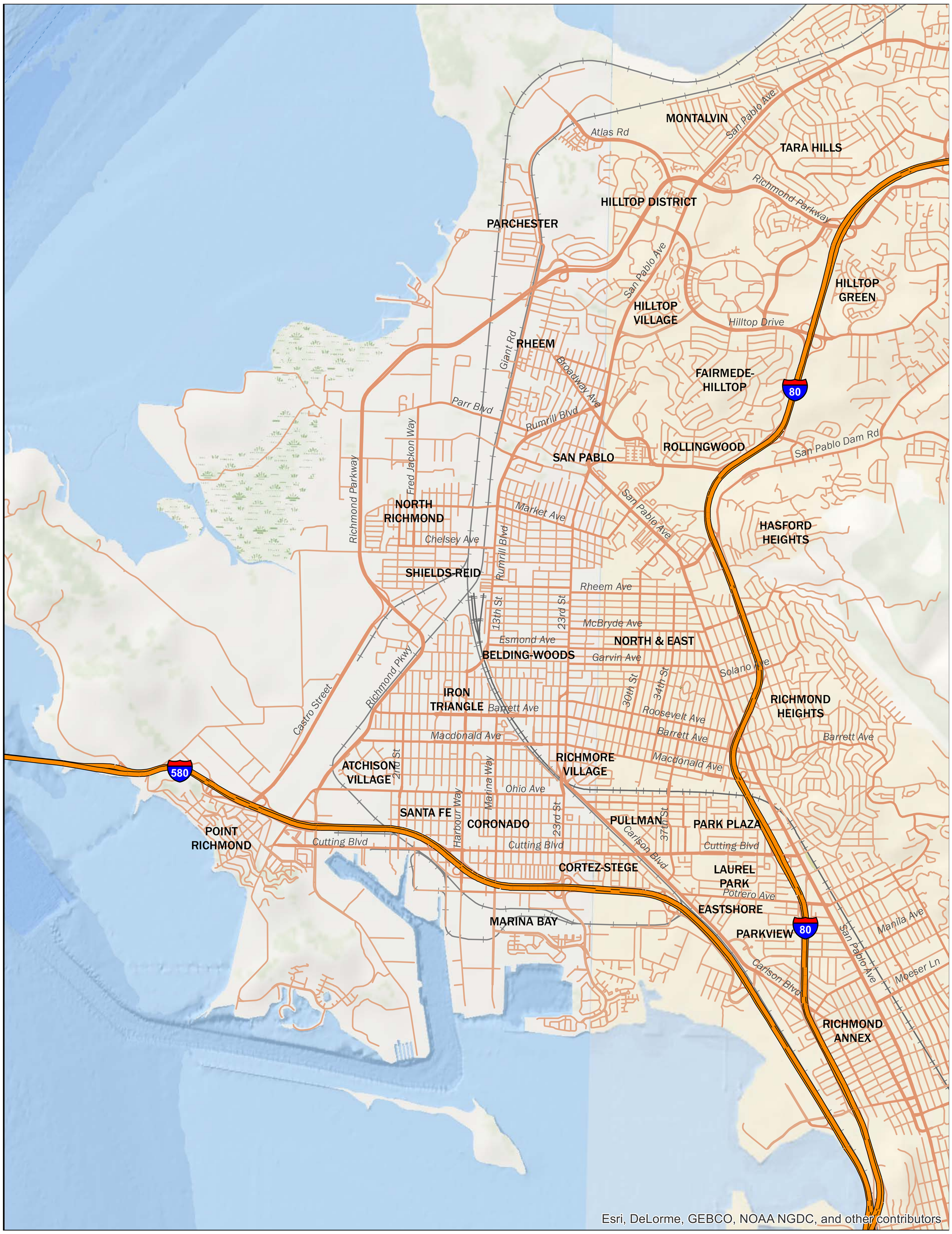
THE PATH TO CLEAN AIR

Where do you live?



THE PATH TO CLEAN AIR

Richmond - San Pablo Community Air Monitoring Plan Timeline

September 2018
Richmond-San Pablo selected for AB 617 Community Air Monitoring Plan Implementation

February 2019
Community Summit
- Created charter
- Formed Steering Committee

April 3, 2019
First SC Meeting
- Orientation

April 11, 2019
SC Meeting
- Selected co-leads
- Capacity building

May 2019
SC Meeting
- Presentations on health, air quality, and meteorology
- Mapping activity on identifying focus areas

June 2019
SC Meeting
- Selected initial monitoring efforts

July 2019
SC Meeting
- Monitoring plan template
- Discussed focus areas

August 2019
SC Meeting
- Discussed timeline for emissions reduction plan

September 2019
SC Meeting
- Decided on emissions reduction plan timeline
- Continued discussion of focus areas

THE PATH TO CLEAN AIR

Richmond - San Pablo Community Air Monitoring Plan Timeline

October 2019
SC Meeting
- Completed discussion of focus areas

November 2019
SC Meeting
- Discuss additional monitoring projects
- Draft monitoring plan

Monthly in 2020
SC Meetings

November 2, 2019
Community Summit
- Update on monitoring plan progress
- Interactive open house

(WE ARE HERE!)

December 2019
SC Meeting

Ongoing in 2020
- Conduct monitoring, analyze and discuss data
- Capacity building, technical assessments to prepare for emissions reduction plan
- Updates to monitoring plan
- Community outreach

December 2020
Formal selection for AB 617 emissions reduction plan

Use data to inform and act on immediate emissions reduction strategies and compile additional strategies

Groundwork Richmond

Changing Places.
Changing Lives.

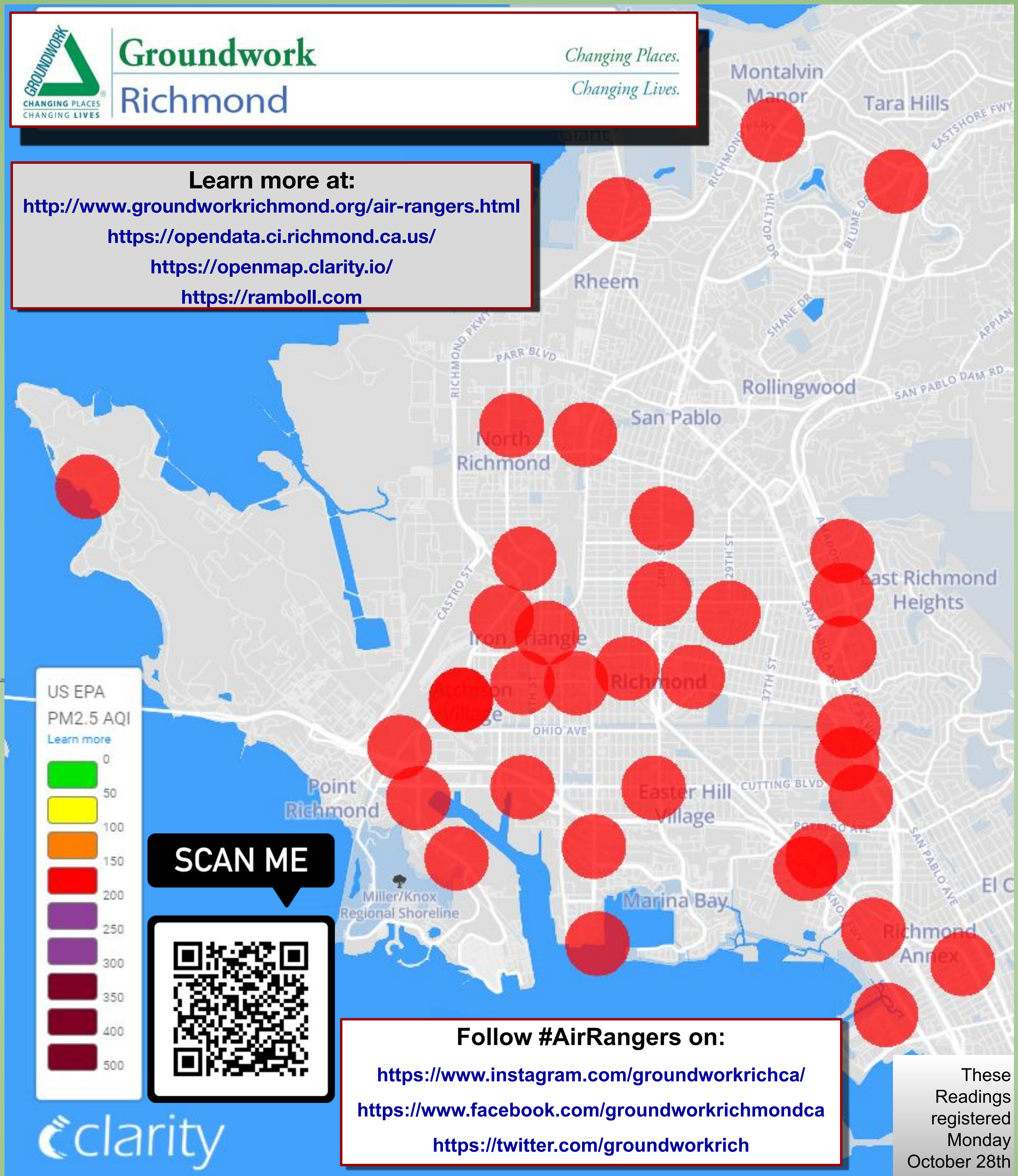
Learn more at:

http://www.groundworkrichmond.org/air-rangers.html

https://opendata.ci.richmond.ca.us/

https://openmap.clarity.io/

https://ramboll.com



SCAN ME

clarity

Follow #AirRangers on:

https://www.instagram.com/groundworkrichca/

https://www.facebook.com/groundworkrichmondca

https://twitter.com/groundworkrich

These Readings registered Monday October 28th

CALIFORNIA AIR RESOURCES BOARD

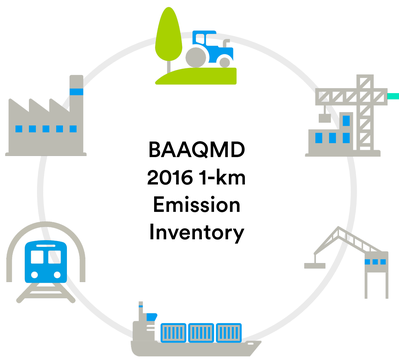
RICHMOND CALIFORNIA AUGUST 7th 1905

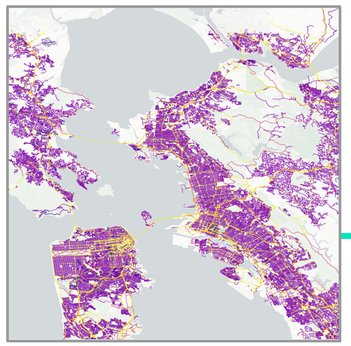
RAMBOLL

Thanks to Our Partners!

Air Rangers: Modeling to Aid Decision-making

Ramboll Shair Modeling System





358,269 Modeled Road Links

Activity data

Observational data

Meteorological data

Realtime traffic data

Learning from measurements

CAMx multi-scale photochemical model

Shairstreet local-scale street model

Sensor data

Realtime and historical air quality maps

Government monitoring data

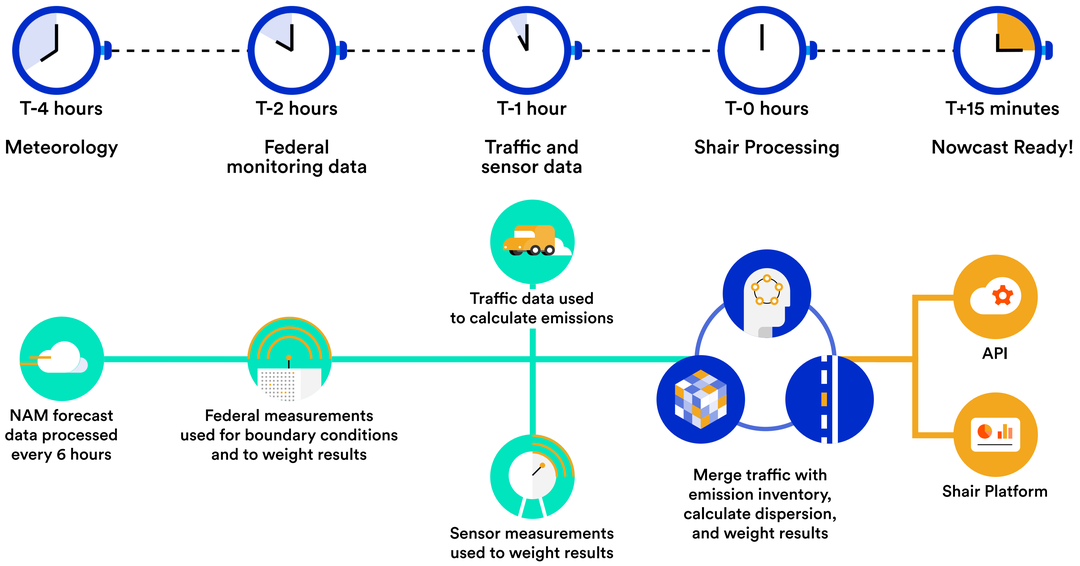
APIs

City of Richmond Data Dashboard

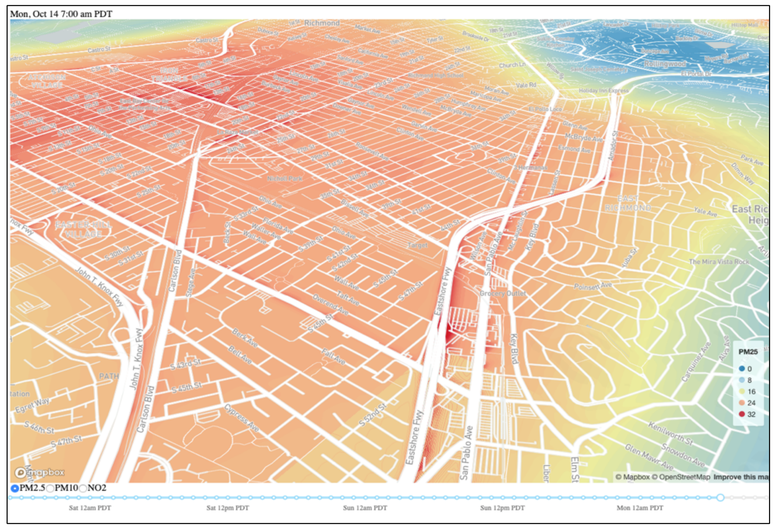
Continuous comparison/validation between model and measurements help identify major emission sources and hotspots not captured by the model

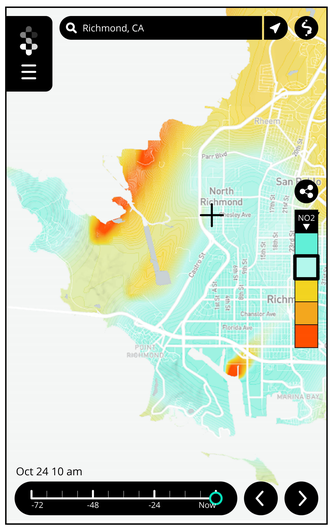
Shair platform

Nowcast Timing



Shair Platform on Web and Mobile Apps





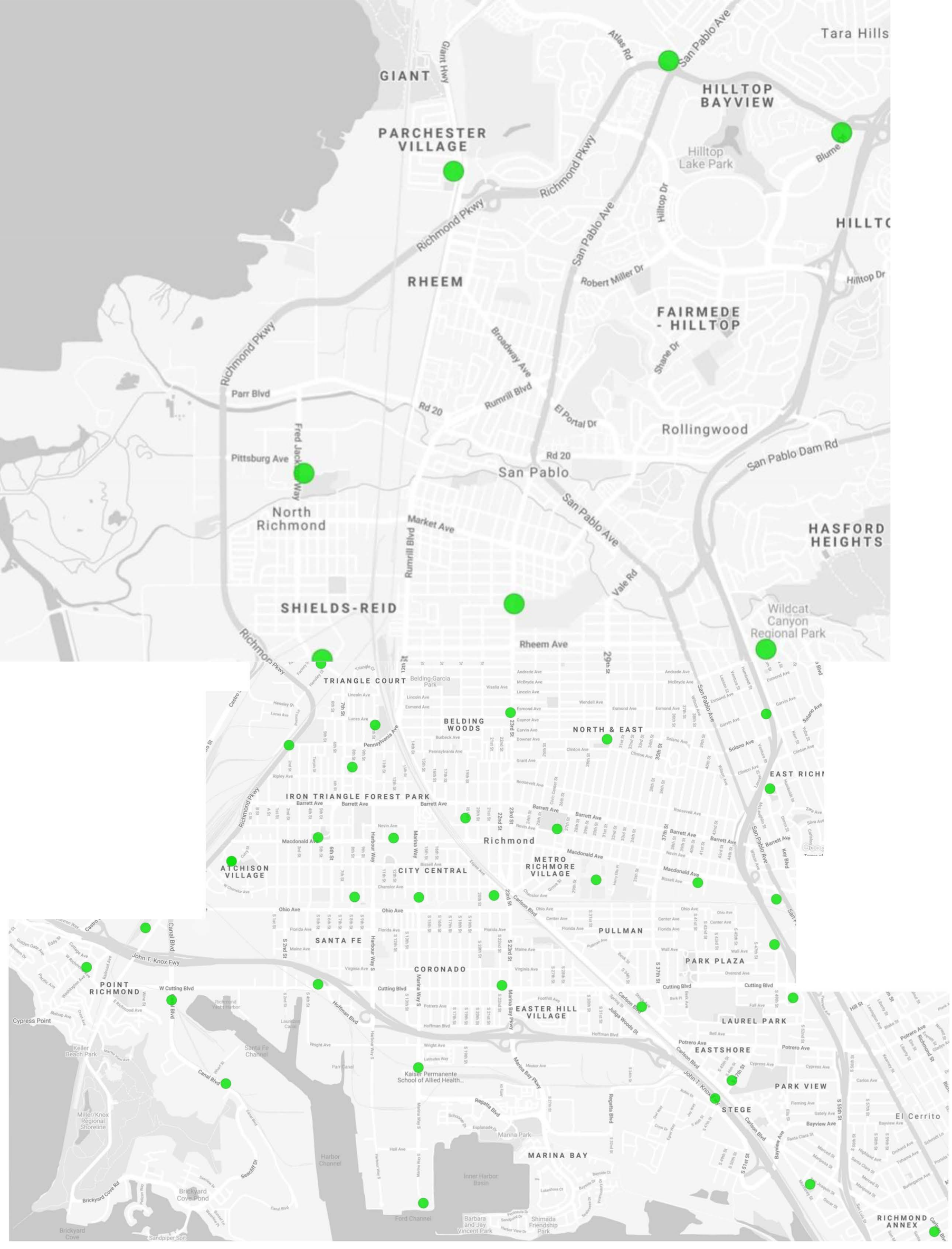
RAMBOLL

GROUNDWORK Richmond

CARB

City of Richmond

Shair
A Ramboll Venture


GIANT
PARCHESTER VILLAGE
HILLTOP BAYVIEW
Tara Hills
Atlas Rd
San Pablo Ave
Giant Hwy
Richmond Pkwy
Hilltop Lake Park
Blume
Hilltop Dr
RHEEM
Robert Miller Dr
FAIRMEDE - HILLTOP
Broadway Ave
Rumrill Blvd
Shane Dr
Parr Blvd
Rd 20
El Portal Dr
Rollingwood
Pittsburg Ave
Fred Jackson Way
San Pablo
San Pablo Dam Rd
North Richmond
Market Ave
HASFORD HEIGHTS
SHIELDS-REID
Vale Rd
Wildcat Canyon Regional Park
Rheem Ave
TRIANGLE COURT
Belding Garcia Park
BELDING WOODS
NORTH & EAST
IRON TRIANGLE FOREST PARK
Barrett Ave
Richmond
Macdonald Ave
ATCHISON VILLAGE
CITY CENTRAL
METRO RICHMORE VILLAGE
Ohio Ave
SANTA FE
CORONADO
PULLMAN
PARK PLAZA
POINT RICHMOND
Cutting Blvd
EASTER HILL VILLAGE
LAUREL PARK
EASTSHORE
PARK VIEW
STEGE
El Cerrito
MARINA BAY
RICHMOND ANNEX
John T. Knox Fwy
Canal Blvd
Cypress Point
Keller Beach Park
Miller/Knox Regional Shoreline
Brickyard Cove Rd
Brickyard Cove Pond
Seacliff Dr
Harbor Channel
Inner Harbor Basin
Marina Park
Regatta Blvd
Kaiser Permanente School of Allied Health...
Ford Channel
Barbara and Jay Vincent Park
Shimada Friendship Park
Richmond Yacht Harbor
Santa Fe Channel
Hoffman Blvd
Marina Bay Pkwy
Carlson Blvd
Juliga Woods St

Richmond Air Monitoring Network

PSE Healthy Energy (PSE) and the **Asian Pacific Environmental Network (APEN)** received an AB 617 Community Air Grant to conduct air quality monitoring in Richmond, North Richmond, and San Pablo.

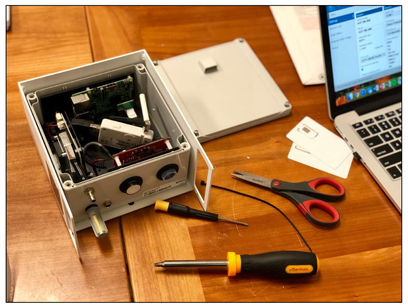
50 sensors, 10 square miles, measurements collected every minute

Particulate matter (PM2.5) • Ozone (O_3) • Nitrogen Dioxide (NO_2) • Temperature • Humidity

Project Goals

- **High quality data for multiple pollutants:** PM2.5, O_3, NO_2. Provide reliable, hyper-local data to the community and regulators.
- **High-density monitoring, data collected every minute:** Characterize concentration gradients, detect short-lived pollution outbursts, identify local air pollution hotspots, and investigate areas of concern in the community.
- **Real-time data visualization:** Visualize air quality data in real-time at the community level in a way that is publicly accessible and in collaboration with co-existing air quality data efforts.
- **Community engagement:** Raise awareness and provide data to address local air quality issues. Encourage community participation in monitor location selection and deployment.
- **Policy engagement:** Translate our data collection efforts into decision making on local, regional, and statewide air quality policies.

Seeking feedback about air quality monitor locations at the January APEN Meeting.



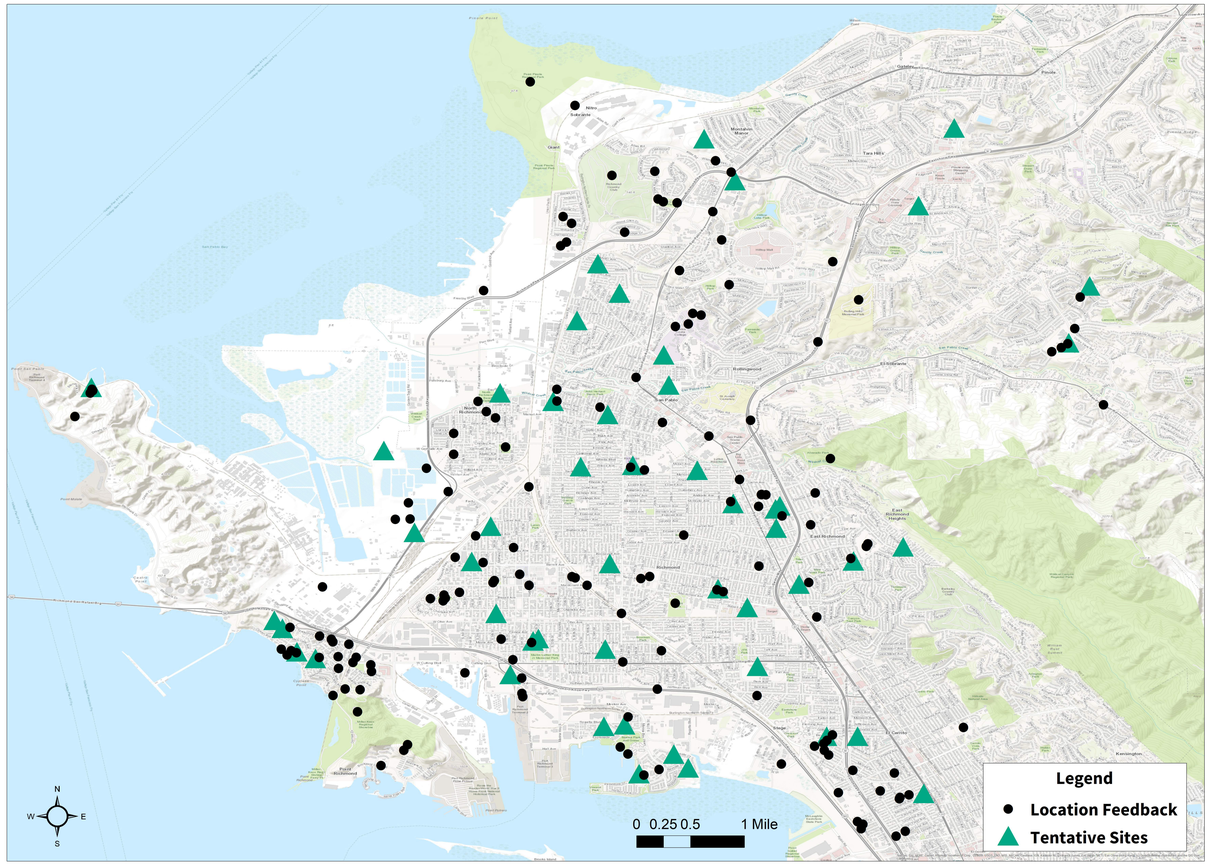
Internal view of the AQY1 monitor.

AQY1 monitors collocated nearby a CARB reference monitor in Sacramento.

Aeroqual AQY1 Air Quality Monitoring System

- Small, portable, easy to install
- Wi-Fi and cellular enabled
- 5W of power (less than a light bulb)

Community Feedback and Tentative Monitor Locations



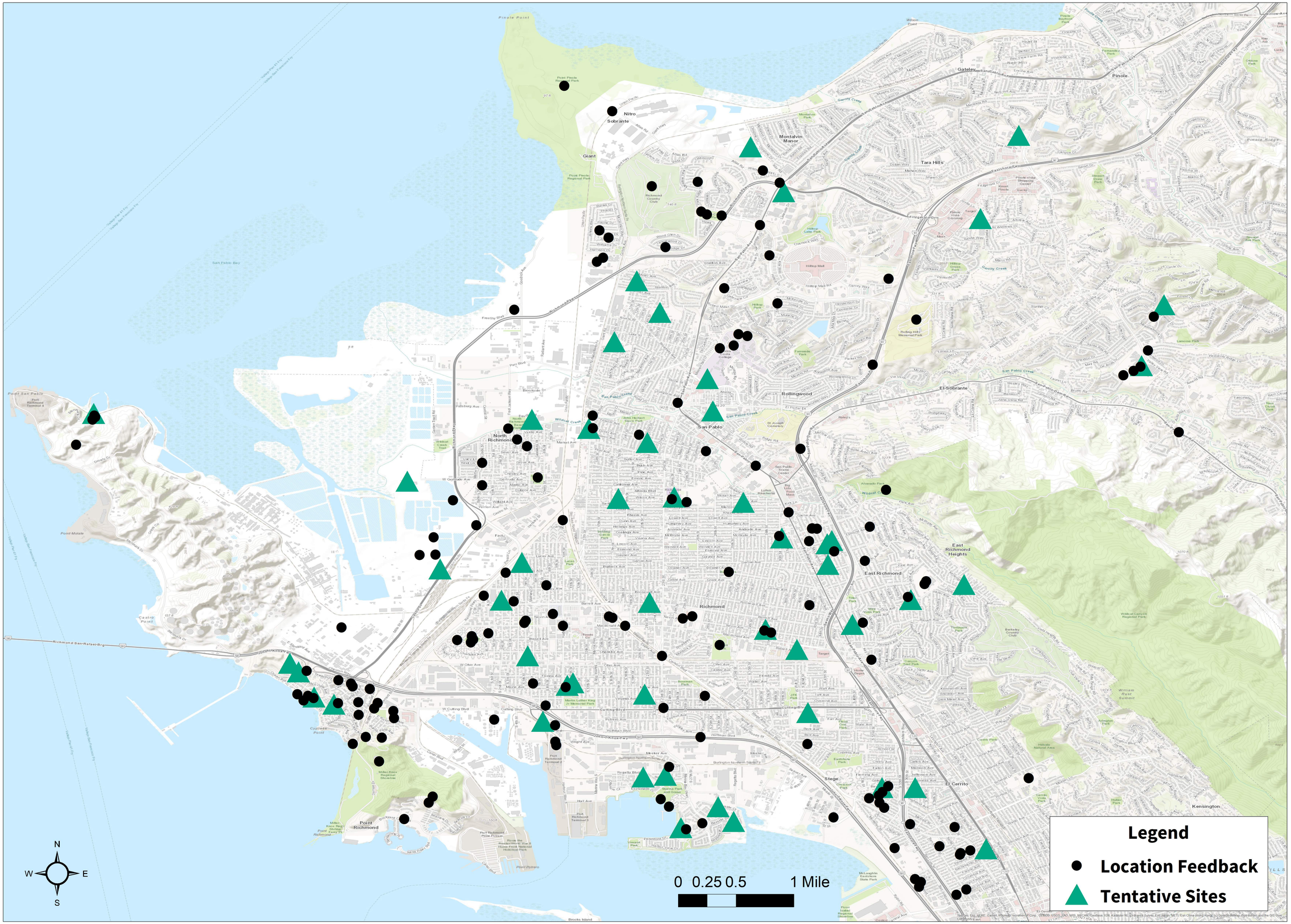
Interested in Hosting an Air Quality Monitor?

Contact Boris Lukanov at blukanov@psehealthyenergy.org.

For more information, visit psehealthyenergy.org/richmond-monitoring.

Project funded by: CALIFORNIA AIR RESOURCES BOARD

Richmond Air Monitoring Network: Community Feedback and Tentative Monitor Locations



THE PATH TO CLEAN AIR

Use dots to tell us what monitoring goals are most important to you!

The Steering Committee developed lists of air pollution concerns and what actions they wanted air quality data to inform.

Next, they will prioritize additional monitoring projects to help address the concerns.

Use four (4) sticky dots to answer the question "Why is additional monitoring data important to you?"

To support reduction strategies for mobile and off-road sources

Marine Vessels: harbor craft, ferries, ocean-going vessels

Diesel truck traffic on surface streets

Railways, Railyards, & Rail crossings

Busy or congested surface streets

Diesel sources: back-up generators & construction equipment

Freeways

THE PATH TO CLEAN AIR

To support reduction strategies for stationary sources

Large permitted sources:
Refinery, Petroleum product storage, Coal terminal at port, Metal scrap or welding, Water treatment plant, Landfill

Warehouses or truck-related businesses

Future sources:
Construction, Cannabis processing

Fugitive sources of particulate matter:
Empty lots, Rock crushing

Common small businesses:
Auto body shops, Restaurants, Dry cleaners, Gas stations

To support other data uses

Provide **real-time & accessible info** about air quality for personal decisions

Locate hotspots of air pollution & understand sources

Track **air quality trends**

Determine source of odors

Share air quality information with **schools, senior centers, & parks**

Air Monitoring Approaches

LONG-TERM, TRENDS MONITORING

- Estimate population exposure and compliance to regulations over long duration
- Highly-accurate measurements
- Understand pollutant composition in an area
- Capture variations in weather & emissions
- Inform other monitoring approaches

SCREENING

- Short duration to cover large areas
- Identify “hot spots” for further investigation

SPECIAL STUDIES

- Investigate emissions from specific sources
- Portable monitoring systems

Factors that Affect Monitoring

- Location & obstructions
- Distance from sources
- Meteorology & topography
- Interferences (such as other gases, water vapor)
- Logistics such as power, security, and access
- Instrument quality and sample duration

How do we answer air quality questions?

Formulate question or objective

Determine approach

Conduct monitoring

Analysis

Answer

Note: Data may already exist that answers the question, and additional monitoring may not be necessary.

Example

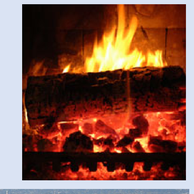
Question: Is particulate matter (PM) higher in certain communities?

Approach: Mobile monitoring can be used to make comparisons of concentrations

Monitoring: Drive with PM sensors repeatedly along city streets

Analysis: Assess where PM is consistently higher

Answer: Areas of highest PM



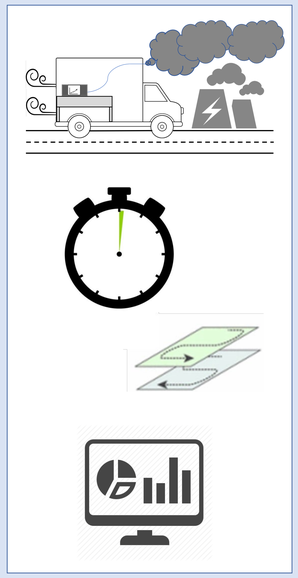
Ways to Conduct Measurements:

Air Quality Monitoring Modes

Mobile: Measurements while in motion

Features:
- Screen pollution over a broad area
- Identify pollution “hot spots”
- Help direct resources & additional monitoring efforts

Considerations:
- Only provides a snapshot of pollutants
- Many passes needed for confidence in results
- Large data sets & complicated analysis
- Limited instrumentation



Saturation: Sensor network

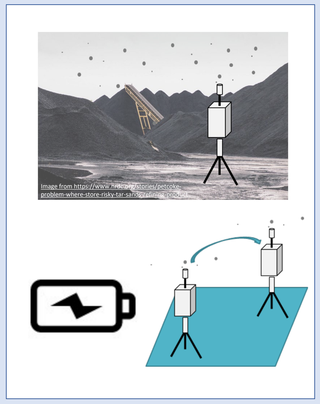
Features:
- Stationary, frequent measurements
- Dense spatial coverage
- Can be easy to use and deploy

Considerations:
- Limited pollutants measured
- Significant resources for upkeep
- Lower-quality data

Portable: Stationary for days to weeks

Features:
- Movable, minimal site preparation
- May identify sources
- Medium to high data quality

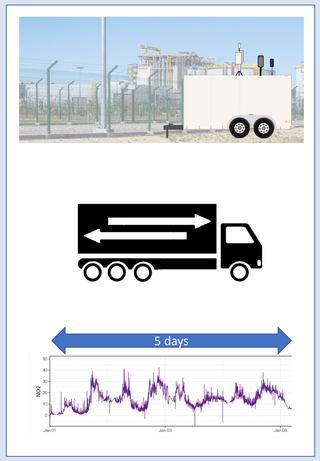
Considerations:
- Temporary monitoring
- May need access to power
- Instruments need to be easy to transport & deploy



Short-term: Stationary for weeks to months

Features:
- Short-term trends of pollutants
- Wide range of instrumentation
- High quality data

Considerations:
- Siting, power, and security needs
- Low spatial coverage
- Build-out may be costly



Long-term: Stationary for a year or more

Features:
- Long-term trends of pollutants
- Wide range of instrumentation
- High-quality data

Considerations:
- Moving difficult
- Siting, power, security, space needs
- Low spatial coverage
- Costly build-out

THE PATH TO CLEAN AIR

Current Air District Actions

- Rule to control Particulate Matter (PM) from refinery fluidized catalytic cracking units (Rule 6-5)

- Rules to control gaseous air toxics from organic storage tanks, wastewater treatment, and heavy liquids equipment at refineries and other facilities (Rules 8-5, 8-8 and 8-18)

- Air Toxics Emissions Reduction rule to ensure emissions verification, health risk assessments, and possible emission reduction plans for Chevron Refinery, Chemtrade West, and West Contra Costa Landfill (Rule 11-18)

- Permitting process that considers stringent health standards when issuing new permits in highly-impacted communities

- Ongoing enforcement and incentive programs

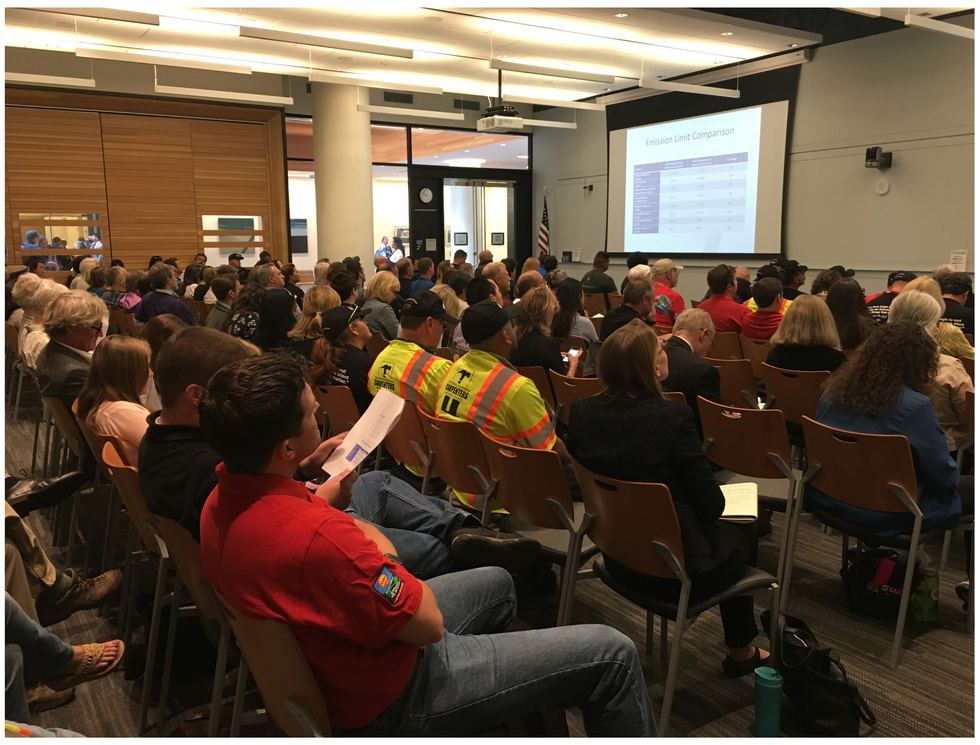
THE PATH TO CLEAN AIR

Gearing Up For Future Actions

The Air District is committed to working with the Steering Committee to prepare for the Community Emission Reduction Plan (CERP) now.

Together, we will:

- Design an inclusive community engagement framework and process to transition between monitoring plan and CERP
- Update emissions information and conduct modeling of Particulate Matter2.5 (PM) and air toxics
- Use monitoring information to:
    - Identify immediate actions
    - Distribute incentive funding
    - Respond to community concerns

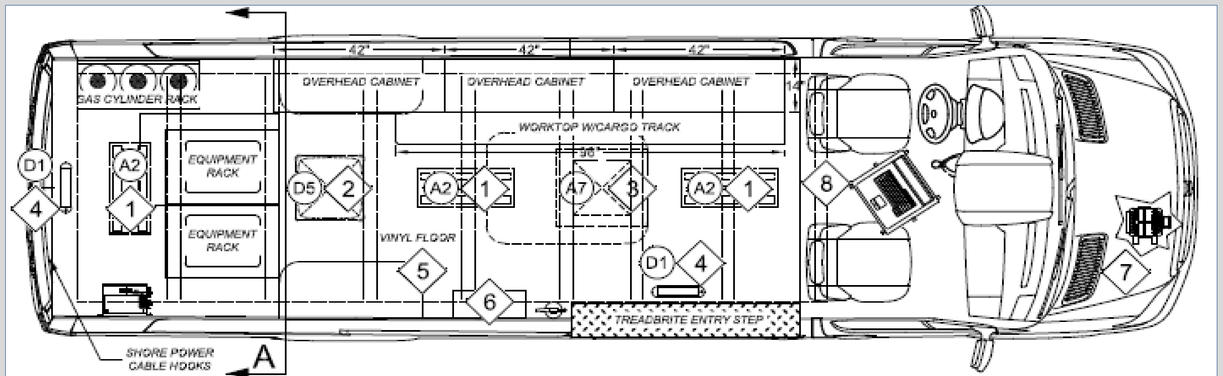


To join this effort,
email RichmondCoLeads@gmail.com

WHAT DOES SUCCESS LOOK LIKE?

Mobile Lab Summary

- General information:
  - Instruments measure either gases or particles
  - Instruments on the passenger side of the van are for gases
  - Instruments on the driver side of the van are for particles
- Gas instruments:
  - Ozone, CO, CO_2, methane, NO/NO_x, volatile organic compounds (VOCs)
- Particle instruments:
  - Particle mass, particle size, black carbon mass



FLOOR PLAN

Particle instruments

- TSI Optical Particle Sizer
  - Particle sizes and mass from 0.3 to 10 µm diameter
- TSI Fast Mobility Particle Sizer Spectrometer
  - Particle sizes and mass from 5.6 to 560 nanometers
- Magee Scientific AE33 Aethalometer
  - Black carbon mass measurement

Gas instruments

- Thermo-Scientific 42C model
  - Ozone
- Thermo-Scientific 49C model
  - NO/NO_x
- Picarro G2401
  - $CO/CO_2/CH_4$
- Ionicon Proton Transfer Mass Spectrometer
  - VOC identification and measurement

Meteorology

- Wind Speed
- Wind Direction
- Solar Irradiance
- Relative Humidity
- Temperature
- Dew point
- Pressure

GPS

- Latitude
- Longitude
- Vehicle heading
- Vehicle velocity