Monitoring Project Option #1: PM Hotspots from Traffic

The Steering Committee identified several questions and air quality concerns related to traffic in the Richmond-San Pablo area, including:

- What is air quality like in neighborhoods along I-80 and I-580 compared to neighborhoods farther from the freeways?
- What are pollution levels on streets adjacent to schools, senior centers, or other locations with vulnerable populations?
- What impact do diesel trucks have on air quality through neighborhoods and near vulnerable populations?
- What impact do traffic backups, such as freeway onramps or at blocked railroad crossings, have on neighborhood air quality?

An air monitoring project that uses multiple measurement methodologies to locate and evaluate hotspots in particulate matter (PM) can help provide data that inform the questions described above. PM measurements for this project would focus on $PM_{2.5}$ (particulate matter with diameter of 2.5 micrometers or less), as these smaller particles generally have greater health impacts. Measurements of black carbon and other particle sizes or properties may also be used to help understand PM hotspots and inform these air quality concerns.

Potential Monitoring Objectives

- Locate and better understand PM hotspots near roadways
- Determine if PM hotspots are near schools, childcare centers, senior centers, recreational areas, or other outdoor locations where people gather
- Compare air quality in neighborhoods near freeways to neighborhoods farther away
- Evaluate PM characteristics to help distinguish PM contribution from diesel combustion

Desired Actions

- Use knowledge of areas/times of PM hotspots to support health-based decision making
- Strategize measures to reduce pollution and exposure caused by traffic around identified PM hotspots, particularly those near vulnerable populations

Data Products

- Mobile air monitoring using the Air District van to drive through communities to measure levels of PM and black carbon through location and time-stamped data
- Portable air monitoring to measure PM levels and PM chemical and physical characteristics, including black carbon, at specific locations over longer durations of time
- Meteorological conditions (wind speed and direction, temperature, humidity)

Considerations and Expected Challenges

- There are many sources of PM in the Richmond-San Pablo area in addition to traffic, such as industrial operations and residential wood smoke. PM measured in Richmond-San Pablo is expected to be a result of local emissions and region-wide pollution transported into the community.
- Robustly characterizing hotspots that are not clearly attributable to traffic may require monitoring for up to a year. However, if impact is quickly apparent and appropriate weather conditions occur, preliminary data could be informative in three months.
- Weather conditions, such as wind direction and precipitation, may not be conducive for short-term studies, possibly requiring additional time to collect sufficient measurement data.

- Logistical considerations such as availability and access to possible monitoring locations, should portable or short-term stationary measurements be needed.

Project Phases

PHASE 0: Project planning (approximately 1-2 months)
- Define specific data objectives needed to inform health-based decision-making efforts and strategize traffic emissions reduction efforts
- Gather and evaluate existing non-measurement data sets, such as traffic and modeling data
- Design plan for evaluating existing monitoring and modeling data
- Design detailed plan for PM hotspots measurements that includes selected monitoring objectives, timeline, location and duration of monitoring, instrumentation, analysis methods, quality assurance and quality control measures, data reporting and intended data uses

PHASE 1: Evaluate existing monitoring data (up to 3 months)
- Evaluate PM data from existing air monitoring networks or projects, including from the three initial monitoring projects, to identify areas/times with higher than average PM near roadways
- If possible, use those existing data to determine the likely source(s) of those PM hotspots
- Determine if identified PM hotspots are near schools, childcare centers, senior centers, recreational areas, or other locations where people gather
- Design plan for selecting specific areas for additional measurements to better understand elevated PM levels

PHASE 2: Follow-up measurements (approximately 3-12 months)
  Use the Air District van, portable samplers, and/or short-term monitoring platforms to collect information on PM physical and chemical characteristics, black carbon and ultrafine particle levels, meteorological conditions, and data on other pollutants to:
  a. Help characterize hotspots that are not well understood after evaluating data from existing monitoring projects, as this characterization may require measurement methodologies that were not part of those existing projects
  b. Help characterize hotspots identified near sensitive or vulnerable populations
  c. Distinguish between gasoline and diesel combustion
  d. Evaluate specific sources or areas of concern as directed by the Steering Committee

Freeways, major roads, and railways in the Richmond-San Pablo area.