San Jose
Community Air Monitoring Plan

California Statewide Mobile Monitoring Initiative (SMMI)

July 2025

Prepared by Aclima, Inc.
in partnership with Acterra and the SMMI Project Expert Group

The Statewide Mobile Monitoring Initiative is part of California Climate Investments, a statewide initiative that puts billions of Cap-and-Trade dollars to work reducing greenhouse gas emissions, strengthening the economy, and improving public health and the environment — particularly in disadvantaged communities.

Summary

This Community Air Monitoring Plan is prepared under the Statewide Mobile Monitoring Initiative (SMMI), a California Air Resources Board project. The SMMI is a statewide effort to use mobile monitoring methods to gather a comprehensive dataset of criteria pollutants, toxic air contaminants, and greenhouse gasses. The SMMI is part of California Climate Investments and aims to reduce greenhouse gas emissions and improve public health, particularly in disadvantaged communities. Aclima, Inc., a California Public Benefit Corporation focused on air monitoring technology, was contracted by the California Air Resources Board to develop and implement Community Air Monitoring Plans using mobile monitoring in 64 Consistently Nominated Communities (CNCs), which have been nominated for the community air protection program, but have not been selected for participation. Resources are needed to address air pollution in these communities.

The primary purpose of the SMMI is to provide better understanding of air pollution in 64 CNCs through mobile monitoring following a rigorously developed community air monitoring plan based on effective and inclusive community engagement.

The purpose of this Community Air Monitoring Plan (CAMP) is to outline the mobile air monitoring that will be conducted in response to air quality issues identified by community outreach in San Jose and inform future plans and community actions. This CAMP will outline monitoring objectives that reflect resident concerns about where and what pollution is most impactful. Community voices directed where mobile air monitoring will take place, the monitoring objectives, and where focused pollution studies are needed. This project also seeks to ensure that data is shared in an accessible way with all interested parties, including community members, to support the planning and implementation of emissions reduction actions. Data will be presented in digital format, in physical printout form, and verbally in public webinars.

Contents

Summary 3
List of Abbreviations Used in the Community Air Monitoring Plan 6
What is the reason for conducting air monitoring? 8
1. Community partnership approach 8
1.1 Project Team Roles and Responsibilities for Community Partnerships 8
1.2 SMMI resources 10
1.2.1 Engagement tools 10
1.3 Statewide community meetings 10
1.4 Engagement during and after monitoring 11
2. State the community-specific purpose for air monitoring 11
2.1 San Jose community profile 12
2.2 San Jose community-specific motivations for air monitoring 13
2.3 Gaps in air quality information that SMMI will address 20
3. Scope of actions 21
4. Air monitoring objectives 22
4.1 Define objectives 22
4.2 Define mobile monitoring methods to support objectives 22
4.3 Community-defined concerns, objectives, and analysis plans 25
5. Project roles and responsibilities 26
How will monitoring be conducted? 30
6. Data quality objectives 30
7. Monitoring methods and equipment 32
7.1 Monitoring equipment 32
7.2 Monitoring methods - broad area monitoring 34
7.3 Monitoring methods - targeted area monitoring 34
7.4 Strengths and limitations of mobile monitoring 35
8. Monitoring Areas 35
8.1 Community Mileage Allocation 35
8.2 Broad Area Monitoring Coverage 37
8.3 Targeted Area Monitoring 40
9. Quality control procedures 43
9.1 Aclima's Quality Assurance and Quality Control Procedures 43
9.2 Partner Mobile Laboratories Quality Assurance and Quality Control Procedures 45
10. Data management 45
10.1 Data categories and levels 46
10.2 Data management pipeline 47
10.3 Data review and quality assurance 47
10.4 Data transfer 47

10.5 Data visualization 47
11. Work plan for conducting field measurements 48
11.1 Broad area monitoring 48
11.1.1 Field materials and procedures 48
11.1.2 Communication and coordination 48
11.1.3 Timeline: duration, frequency, milestones, and deadlines 48
11.2 Targeted area monitoring 49
11.2.1 Field materials and procedures 49
11.2.2 Field communication and coordination 49
11.2.3 Timeline: duration, frequency, milestones, and deadlines 50
How will data be used to take action? 50
12. Evaluating effectiveness 50
12.1 Evaluating effectiveness during the monitoring period: 50
12.2 Evaluating effectiveness at the end of the Monitoring Period: 51
12.3 End of monitoring 52
13. Data analysis and interpretation 53
13.1 Preparation of finalized datasets 53
13.2 Aclima analysis, interpretation, and visualization of data 53
14. Communication of results to support action 57
14.1 Reporting of high concentrations prior to the end of the contract 57
14.2 Public Data Access 59
14.3 Community Story Maps 59
14.4 Final Report 60
Appendices 61

List of Abbreviations Used in the Community Air Monitoring Plan

Abbreviations	Term
AMN	Aclima Mobile Node
AMPs	Aclima Mobile Platforms
AQS	Air Quality System
BC	Black Carbon
C2H6	Ethane
CAMP	Community Air Monitoring Plan
CARB	California Air Resources Board
CBOs	Community-Based Organizations
CES	CalEnviroScreen
CH4	Methane
CNC	Consistently Nominated Community
CO	Carbon Monoxide
CO2	Carbon Dioxide
ESUHSD	East Side Union High School District
EPA	Environmental Protection Agency
GHGs	Greenhouse Gases
L0	Level 0
L1	Level 1
L2a	Level 2a
L2b	Level 2b
L3	Level 3
L4	Level 4
NO	Nitric Oxide

NO2	Nitrogen Dioxide
O3	Ozone
PEG	Project Expert Group
PEL	Permissible Exposure Limit
PI	Principal Investigator
PM2.5	Fine Particulate Matter
PML	Partner Mobile Laboratory
PPIC	Public Policy Institute of California
QA	Quality Assurance
QC	Quality Control
REL	Recommended Exposure Limit
RFP	Request for Proposal
SMMI	Statewide Mobile Monitoring Initiative
TVOC	Total Volatile Organic Compounds

What is the reason for conducting air monitoring?

1. Community partnership approach

The Statewide Mobile Monitoring Initiative (SMMI) prioritizes forming strong community partnerships from the outset to guide the development of Community Air Monitoring Plans (CAMPs).

The SMMI Community Engagement Plan (Appendix A) is central to the success of the SMMI, emphasizing that communities must have a leading role in design, engagement, and implementation for the initiative to be successful. Aclima has implemented a co-leadership model with existing community experts and co-ownership with communities. This model is informed by CARB's Community Engagement Model, the People's Blueprint, CARB's Blueprint 2.0, and Facilitating Power's Spectrum of Community Engagement to Ownership. The goals of the community partnership approach include:

1. Develop and implement CAMPs that are responsive to the air quality concerns and needs of community members in pollution-overburdened areas.
2. Define monitoring objectives that reflect resident concerns about where and what pollution is most impactful. Community voices will direct where mobile air monitoring takes place, the monitoring objectives, and where focused pollution studies are needed.
3. Build community capacity to interpret mobile air quality data and help translate data into actions for emissions reduction and public health improvement.
4. Ensure that data is shared in an accessible way with all interested parties, including community members, to support the planning and implementation of emissions reduction actions. stakeholders to address local needs.

Several groups play integral roles in the implementation and success of the SMMI. The SMMI Project Expert Group (PEG) includes community members, representatives from local air districts, community-based organizations (CBOs), and academia. Over 50 percent of the PEG comprises community members or representatives of CBOs. Engagement Leads, who are trusted community organizations, are subcontracted to lead and facilitate community engagement in the 64 Consistently Nominated Communities (CNCs). These Engagement Leads work closely with Aclima and the PEG to ensure CAMPs are responsive to community needs and that engagement is culturally and linguistically relevant. The California Air Resources Board (CARB) funds and oversees the SMMI. Aclima, as the contracted air monitoring technology company, is responsible for conducting community engagement and mobile monitoring. The project aims for a collaborative process where community members actively contribute to defining air monitoring objectives and the scope of actions.

1.1 Project Team Roles and Responsibilities for Community Partnerships

The core project team is made up of paid staff at a number of different organizations. These are described in Table 1. Additional project roles and responsibilities are outlined in Section 5.

Engagement Leads: Aclima subcontracted with trusted community-based organizations to lead and co-manage community engagement efforts in the designated communities. Engagement Leads distribute an air pollution concerns survey and lead and conduct outreach for two community meetings, which serve as forums for community members and other interested parties to discuss local air pollution concerns and define where they would like air quality monitoring to occur. The Engagement Lead is also responsible for summarizing these meetings for Aclima, who then integrates community concerns into the CAMP. Engagement Leads serve as a conduit between community members and Aclima and CARB, helping to raise community questions and concerns and communicating project updates to the community.

Project Expert Group (PEG): A cross-sector group of representatives from local air districts, community-based organizations, academia, and residents from overburdened communities that guides community engagement and decision-making for this project. Over 50 percent of the Project Expert Group is composed of community members or representatives of community based organizations. The PEG serves as a trusted group of experts to help define and steer the initiative and ensure it meets community needs. PEG members are responsible for attending eight meetings during the project period, and completing six assignments that help inform and steer the project. Specifically, PEG members helped shape the content of the Community Engagement Plan, served on the selection committee for Engagement Leads, and shaped the methodology for allocating monitoring miles to each project community. Outside of meetings and assignments, Aclima requests that PEG members support decision-making in areas relevant to their professional and lived experiences.

Aclima's Project Team: Aclima monitors local engagement strategies and supports Engagement Leads by offering technical expertise, data interpretation, outreach materials, and meeting support. Aclima is responsible for organizing and facilitating all PEG meetings and managing PEG assignments.

Table 1: Project teams and contact details

Organization/team	Contact details	Type of Support Offered
CARB	smmi@arb.ca.gov	All project questions after the project has completed (May 2025)
Aclima	carb-team@aclima.earth	Monitoring updates and CAMP questions during the project period (through May 2025)
Project Expert Group	carb-team@aclima.earth	Questions about community engagement framework and statewide engagement opportunities during the project period (through May 2025)
Acterra (Engagement Lead)	jacky.vera@acterra.org	Community engagement questions during the project period (through May 2025)

1.2 SMMI resources

The CARB SMMI website (https://ww2.arb.ca.gov/statewide-mobile-monitoring-initiative) details the objectives of the SMMI; the size and recipient of the contract award and collaborations with research institutions. Additionally the website outlines community engagement efforts, public participation opportunities, and the development of air monitoring plans. The website provides access to summary documents including the original CARB Request for Proposal (RFP), a project summary one-pager, FAQs, and Aclima's technical proposal.

The Aclima SMMI website (https://aclima.earth/ca-smmi) provides an overview of the SMMI. It explains the community engagement approach, project scope, monitoring technology and approach, and data availability. The website also provides access to the joint Aclima-CARB press release.

1.2.1 Engagement tools

The online and offline tools used to support community engagement as part of CAMP development include:

Online

- Aclima Project Website: For updates, resources, and contact information.
- Air Pollution Concern GeoSurvey: Online survey to gather community input on air quality concerns.
- Broad Area Monitoring Selection tool for community members to select the boundaries for broad area monitoring given allocated driving resources for each community
- Social Media Graphics: Customizable graphics and text for outreach efforts.
- Meeting Summary Report: Document template for documenting meeting content.

Offline

- Physical Flyers: Customizable flyers for distribution at community hubs.
- Community Air Monitoring Plan Development Handout: Infographic detailing the Community Air Monitoring Plan development process.
- Door-to-door outreach (in some communities)
- Phone call/text message outreach (in some communities)
- Radio announcements and/or project interviews (in some communities)

1.3 Statewide community meetings

The Community Engagement Plan includes the following statewide community meetings:

- **Pre-meeting / Introduction to project**: An online meeting introducing the project and answering questions, held at the air district level.
- **Meeting 1 / First Draft Community Air Monitoring Plan Boundary**: A hybrid (in person and online) meeting to identify community air quality concerns, monitoring objectives, monitoring areas, and community roles in the project.
- **Meeting 2 / Affirming Community Air Monitoring Plan**: A hybrid (in person and online) meeting to confirm monitoring areas and review draft Community Air Monitoring Plan(s).

- **Meeting 3 (series) / Project Results**: A series of online meetings, organized geographically by air district (or at a sub-district level if necessary), to explain project results, answer questions, and discuss next steps.

1.4 Engagement during and after monitoring

There will continue to be opportunities for the public to engage with the SMMI throughout monitoring and after completion of monitoring.

During the monitoring period:

- Project website: use the project website to access updates, resources, and contact information
- Webinars and training: participate in online sessions about data literacy, interpretation, emissions reduction success stories, and air management policies/regulations
- Community-specific project pages (via project website): Find updates, contact information, and leave comments/feedback for each Consistently Nominated Community on the project website
- Continued communication: receive email updates on monitoring progress (if contact information was provided during the engagement process).
- Office hours: Attend online office hours to ask project-related questions of the Aclima team

After the monitoring period:

- Publicly available data hosted by CARB
- StoryMaps: Explore interactive data visualizations for each Consistently Nominated Community
- Project Results meeting: Attend online meetings to learn about project results, ask questions, share experiences, and discuss next steps. These meetings will be held in English with Spanish interpretation and designated Spanish breakout rooms.
- Post-Meeting Survey: Provide anonymous feedback on the project and engagement process after the Project Results Meetings.

2. State the community-specific purpose for air monitoring

The primary purpose of the SMMI is to develop and implement Community Air Monitoring Plans that are responsive to the air quality concerns of community members and other stakeholders in the 64 CNCs. These communities have been consistently nominated by air districts, CBOs, and community members as needing extra attention to address high levels of air pollution.

Community air monitoring generally falls into to two types of air pollution concerns:

1. Ambient air quality monitoring - measure the levels of relevant air pollutants to understand which areas of the community are experiencing **disproportionate or unequal impacts** from air pollution as well as evaluate measured concentrations against existing standards and historical information.
2. Stationary source monitoring - measuring air pollutants near **specific stationary emission sources** (e.g. industrial facilities) so the emissions from the source can be characterized and the impact of the emissions on the local community can be assessed.

This air monitoring plan will address these monitoring aims - identify and characterize areas experiencing disproportionate air pollution impacts and specific air pollutant emission sources - by focusing on specific sources and air pollution concerns identified by the community.

Resident and other interested parties' knowledge was solicited through community meetings and surveys to understand the community's pollution burdens. A specifically designed Air Pollution Concerns Survey was used to help identify priority air pollution concerns in each community and collect detailed information to guide monitoring objectives. The CAMPs will define where mobile air monitoring takes place, what the monitoring objectives are, and where focused pollution studies are needed, all directed by community voices.

2.1 San Jose community profile

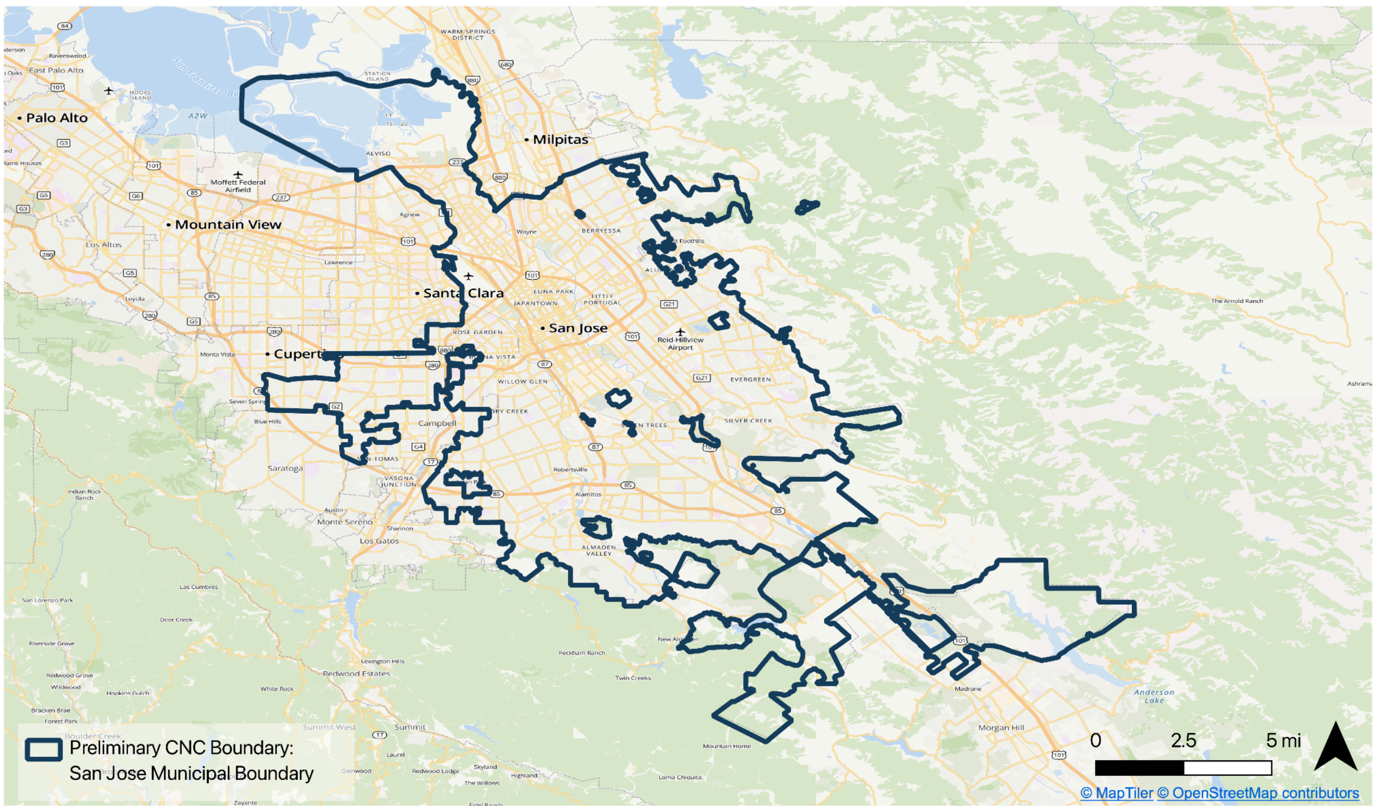


Figure 1: San Jose municipal boundary

San Jose is the largest city in Northern California in both population and land area, with approximately 969,655 residents as of July 2024. San Jose is located in the Santa Clara Valley at the south end of the San Francisco Bay. The city is bordered on the west by the Santa Cruz Mountains and on the east by the Diablo Range. San Jose is an economic hub to the region, with an international airport and a significant number of freeways that pass through the city.

San Jose's population is strikingly diverse, with a majority made up of communities of color, including large Asian (35%) and Latino (31 %) populations, alongside significant multiracial and immigrant communities. Several census tracts in San Jose have been designated as SB 535 disadvantaged communities. Most are located along highway 101, especially south of 280 between Highway 82 and Highway 101 as well as in northern San Jose. 21 % of the population has an income of less than two times the federal poverty level and 18% of the low income households are highly burdened by housing costs . More than 40% of residents speak a language other than English at home, including Spanish, Vietnamese, and Chinese. San Jose's size and diversity pose unique challenges and opportunities for equitable community engagement. Multilingual outreach is essential to ensure accessibility, and culturally competent engagement strategies are needed to navigate varying degrees of trust in government and differing community norms. Socioeconomic disparities—particularly between affluent areas and lower-income neighborhoods such as East San Jose—further complicate participation, necessitating responsive, locally informed strategies to support engagement in environmental health issues.

Air quality is among the most pressing public health challenges in San Jose, which ranks among the worst in the U.S. for pollution levels, largely due to transportation emissions from cars, trucks, planes, and ships. Wildfires and the city's geography—nestled against mountains and affected by marine inversions—worsen the issue by trapping pollutants. In the summer, ozone concentrations often exceed EPA standards, contributing to respiratory and cardiovascular illness, especially in communities adjacent to major highways and industrial zones. East San Jose, in particular—home to many working-class Latino and immigrant families—is a designated California Climate Investments Priority Population and experiences high concentrations of ozone and particulate matter (PM10, PM2.5), as documented by BAAQMD's monitoring at the nearby Jackson Street station. CalEnviroScreen 4.0 indicators for San Jose report the city is in the 55th percentile for diesel particulate matter and 61st percentile for traffic impacts, indicating significant local impacts from heavy traffic. The CalEnviroScreen health outcomes indicators show that San Jose has a 50th percentile for Asthma incidence.

2.2 San Jose community-specific motivations for air monitoring

Community-identified air pollution concerns

To identify the community-specific motivations for air monitoring in San Jose, Aclima worked with Acterra to gather air quality and emission source concerns directly from the community. An SMMI Air Pollution Concerns survey was circulated by email, distributed in person community meetings, and made available during other events in the community. In addition, Acterra would collect air pollution concerns voiced during community meetings in support of the SMMI effort.

Residents and community advocates identified a wide range of known and suspected pollution sources throughout the city. These include major highways like HW 101, HW 87, and HW 85; heavily trafficked roads like King Road, Guadalupe Parkway, and Monterey Highway; industrial zones around Zanker Road and Trimble Road; and localized hotspots near transportation companies, airports, auto shops, and even schools. Community members have raised concerns about pollution from residential wood burning, construction, waste processing centers, aircraft emissions, and homeless encampments where open burning and trash accumulation contribute to localized pollution spikes. The Rose Garden area, Communication Hill, and neighborhoods near the Breathe California office on Park Avenue have all been flagged for recurring air quality issues, particularly during school hours and rush-hour traffic.

In addition to those summarized above, other specific concerns identified through community engagement are included in the table 2 below. These concerns were compiled from community members during community meetings as well as through the SMMI Air Pollution Concerns Survey.

Table 2: Specific concerns identified through community engagement

Location and Concern	Details
The San Jose Airport and Reid-Hillview airport	"various including cars/trucks/planes, small businesses, factories, etc." "Aviation fuel emissions and car emissions." "Industrial emissions" "the location of the source might be due to high level of fumes from community industries, vehicles on the roads using petrol energies and so on this resulting to high rate of air pollution " "Jet fuel emissions from San Jose International Airport and Reid-Hillview Airport" "Noise and air pollution affecting East and North San Jose"
Industrial Areas: Foothill neighborhoods, Newby Island Landfill, Edenvale, and areas with local factories and power generation facilities.	"Local factories and industries emit smoke and waste, polluting nearby communities." "Pipes and industrial effluents release harmful substances into the air." "large production companies and food stores contribute to poor air quality." "permanent/Permanente Quarry (west of San Jose)" "Newby Island Landfill is a major industrial impact zone." "Edenvale" "Construction and development zones contribute to particulate pollution." "Foothill neighborhoods near industrial zones are affected." “Knox Avenue"
General impacted areas: Alviso Berryessa East San Jose Downtown San Jose North San Jose	Alviso – specifically called out as an impacted area. Berryessa – listed among areas experiencing pollution. East San Jose – highlighted for proximity to traffic and industrial activity. Downtown San Jose – impacted by traffic, freeways, and construction. North San Jose – affected by both airport and freeway pollution. Edenvale – near industrial and landfill operations. Foothill neighborhoods – mentioned due to industrial proximity. Knox Avenue – named directly as an affected location.
Multiple Traffic and Transportation Corridors: San	Vehicle exhaust pipes, diesel trucks, and cars using gasoline contribute significantly to pollution.

Jose is a major freeway intersection. There were a lot of concerns about vehicle emissions, freeways (I-101, I-280, I-680, I-880), and diesel trucks. Specific areas: Near highways, Knox Ave, and around downtown and North San Jose.	Highways and freeways (specifically I-101, I-280, I-680, I-880) are major corridors of air pollution. Traffic congestion in Downtown, North San Jose, and around transportation corridors increases air quality issues. People living near highways (e.g., "I live near 101 and 680") experience worsened air quality. Construction activities around roadways add dust and particulate matter to the air.
Airports	Concerns about aviation exhausts and smells of engine fuels, health risks from long-term exposure, and risks from concentration in a small place.
Roadways	Concerns about traffic, warehouses, and wildfire smoke as culprits of poor air quality, especially in certain neighborhoods , harmful emissions exposing residents in residential areas , and fumes from nearby activities like printing.
Wastewater treatment plant	No additional details provided
Power plant (Metcalf Energy Center)	Though noise is mitigated, it could still be improved upon.
Sports and Concert Venues	Note higher traffic congestion at certain times of the day specifically near sports/concert venues such as SAP Center, PayPal Park, Levi Stadium, etc. It is important to capture the air monitoring data during the events and check if levels are harmful to the community members living in the area.
Industrial sites in san jose	For industrial sites they mentioned a Stucco company (Little Orchard and San Jose) in the West Side and Alma Road. Industrial areas in North San Jose near Trimble Road and Zanker Road. There are some waste management facilities and recycling centers in the vicinity, where the breakdown of organic material or industrial waste could generate air pollutants like methane, VOCs and other particulate matter causing harmful air pollutants. Companies like Cisco Systems and others have big factories in this area where semiconductor manufacturing can release pollutants like tiny particles (PM), chemicals (VOCs) and other substances that can harm the air quality.
Multiple sources and impacted areas	-King Road and 101 South -Guadalupe Road, 87 (from the airport down) -85 South to 87 -Little Orchard - near the marble and cement manufacturer site -Empire Street -Communication Hill:What used to be there? Is the soil contaminated? -Julian Street -Pomona Road: There is a Transportation company near there. There is congestion on that road due to the Transportation company. Little Orchard was brought up again during this discussion. -Along Monterey Highway are multiple auto shops, Granite rock facility, and National Site Materials that contribute to more air pollution in those areas.

	There is also high traffic congestion before work and after work that contributes to poor air pollution overall. Community members in meeting 2 also wanted to ensure schools, daycares, and community centers (like the Mayfair Community Center where the meeting took place at) are going to be monitored. These are schools their child attends or lives nearby. -Andrew Hill High School -Watson Park -Rocketship Academy (13 schools in the Bay Area) -Yerba Buena High School: -La Crecia Community members wanted monitoring near the Breathe California office, located on 1469 Park Avenue. They are located by several schools (Elementary, Middle, and High School) (before and after school traffic), airport, downtown San Jose, and road construction. Rose Garden Area is directly downwind from the office location.

San Jose has undertaken a variety of emissions reduction and environmental justice initiatives. Through programs like Climate Smart San José and its Greenhouse Gas Reduction Strategy, the city promotes clean energy, building electrification, and sustainable transit. However, these efforts have not always reached the communities most affected by pollution. Grassroots and nonprofit-led efforts have stepped in to fill the gap. Since 2016, Acterra has promoted electric vehicle adoption through its Karl Knapp Go EV Program and has partnered with BAAQMD and San José Clean Energy to deliver community education and financial incentive clinics. Despite these efforts, disparities persist. While affluent neighborhoods may experience more rapid environmental improvements, historically underserved communities—especially in East San Jose—continue to bear a disproportionate burden of pollution exposure. Effective change requires not only data and policy but also inclusive community engagement that centers the voices and priorities of those most impacted. By integrating qualitative data from community members with block-by-block air quality monitoring and youth-led research, San Jose has the opportunity to lead with equity in environmental health planning.

Top pollution sources identified via emission inventories

Aclima scientists gathered important sources from available emission inventories, focusing on major polluting facilities and AB2588 Air Toxics Hot Spots. Known pollution sources within San Jose are listed in Tables 3-5. Table 3 lists the top ten AB2588 toxics hotspots within or near the San Jose monitoring area boundary (up to 200 meters outside), ranked by total toxicity-weighted emissions (TWE) across chronic, cancer-causing, and acute categories. These facilities include FIREYE INC., San Jose Water Company, KLA Corporation, and others. The table details each facility's name, geographic coordinates (longitude and latitude), a description of its business or service, and the reported pollutants. Common pollutants include Diesel engine exhaust and particulate matter, with some facilities reporting additional substances like Benzene, Lead, Chromium, Formaldehyde, and various metals. Table 4 identifies major polluting facilities within the monitoring area boundary (up to 200 meters outside). California State University, San Jose, described as "Other Combustion Source," and Equinix - Lundy, described as "Electricity Generation," are included. The reported pollutants from these facilities range from SOx and Benzene to Hexavalent Chromium. Additionally, a commercial sterilization facility, Auris Health, is located within five miles of the monitoring area boundary. This facility is known to emit ethylene oxide, based on data from the EPA's Hazardous Air Pollutants - ethylene oxide information.

These tables serve to highlight significant sources of air pollution identified through emission inventories, complementing the community-identified concerns by providing specific data on industrial and commercial facilities that may contribute to air quality challenges in the region.

Table 3: Top 10 AB2588 toxics hotspots located within the monitoring area boundary for San Jose (up to 200 m outside the boundary), as defined by the total toxicity-weighted emissions (TWE) for chronic, cancer causing, and acute categories combined.

Facility Name	Longitude	Latitude	Description	Reported Pollutants
FIREYE INC.	-121.9220	37.4175	COMPUTER PROGRAMMING SERVICES/BUSINESS SERVICES/COMPUTER/ DATA PROCESSING SVCS/	Diesel engine exhaust, particulate matter (Diesel PM)
SAN JOSE WATER COMPANY	-121.8748	37.3445	WATER SUPPLY/ELECTRIC,GAS,SANITARY SERVICES/WATER SUPPLY/WATER SUPPLY	Diesel engine exhaust, particulate matter (Diesel PM)
KLA CORPORATION	-121.9298	37.4190	INSTRU TO MEASURE ELECTRICITY/INSTRUMENTS & RELATED PRODUCTS/MEASURING /CONTROLLING DEVICES/INSTRUMENTS FOR MEASURING AND	Benzene, Lead, Chromium, hexavalent (& compounds), Manganese, Diesel engine exhaust, particulate matter (Diesel PM), Cadmium, Mercury, Nickel, Arsenic, Toluene, Formaldehyde, Methanol, Isopropyl alcohol, Beryllium
REGIONAL MEDICAL CENTER OF SAN JOSE	-121.8502	37.3617	GENERAL MED/SURGICAL HOSPITALS/HEALTH SERVICES/HOSPITALS/GEN MEDICAL,SURGICAL HOSPITALS	Benzene, Toluene, Formaldehyde, Diesel engine exhaust, particulate matter (Diesel PM)
BSREP II SJ TOWERS LLC C/O HARVEST PROPERTIES INC.	-121.8893	37.3372	REAL ESTATE AGENTS/MANAGERS/REAL ESTATE/REAL ESTATE AGENTS, MANAGERS/REAL ESTATE AGENTS AND MANAGRS	Diesel engine exhaust, particulate matter (Diesel PM)
SAN JOSE WATER COMPANY	-121.8679	37.3275	WATER SUPPLY/ELECTRIC,GAS,SANITARY SERVICES/WATER SUPPLY/WATER SUPPLY	Diesel engine exhaust, particulate matter (Diesel PM), Nickel, Manganese, Chromium, hexavalent (& compounds), Arsenic, Lead, Mercury, Beryllium, Cadmium

CORESITE	-121.9163	37.4057	DATA PROCESSING & PREPARATION/BUSINESS SERVICES/COMPUTER/ DATA PROCESSING SVCS/DATA PROCESSING SERVICES	Diesel engine exhaust, particulate matter (Diesel PM)
EQUINIX LLC	-121.8885	37.3882	TELEPHONE COMMS, EXC RADIO/COMMUNICATIONS/TELEPHONE COMMUNICATIONS/	Diesel engine exhaust, particulate matter (Diesel PM)
COUNTY OF SANTA CLARA	-121.9060	37.4187	GENERAL GOVERNMENT, NEC/EXEC,LEGISLATIVE, GENERAL GOV./OTHER GENERAL GOVERNMENT/OTHER GENERAL GOVERNMENT	Diesel engine exhaust, particulate matter (Diesel PM)
STACK INFRASTRUCTURE	-121.8930	37.4027	COMPUTER RELATED SERVICES, NEC/BUSINESS SERVICES/COMPUTER/ DATA PROCESSING SVCS/OTHR COMPUTER RELATD SERVICES	Lead, Manganese, Mercury, Nickel, Arsenic, Cadmium, Formaldehyde, Benzene, Chromium, hexavalent (& compounds), Beryllium, Diesel engine exhaust, particulate matter (Diesel PM)

Table 4: Major polluting facilities located within the monitoring area boundary (up to 200 m outside the boundary).

Facility Name	Longitude	Latitude	Description	Reported Pollutants
California State University, San Jose	-121.885	37.335	Other Combustion Source	SOx, Benzene, Hydrochloric Acid, NOx, PM2_5, N2O, PM10, Formaldehyde, Diesel PM, Nickel, CH4, Hydrogen Sulfide, 1,3-Butadiene, Chromium Hexavalent
Equinix - Lundy	-121.888	37.388	Electricity Generation	SOx, Benzene, Hydrochloric Acid, NOx, PM2_5, N2O, PM10, Formaldehyde, Diesel PM, Nickel, CH4, Hydrogen Sulfide, 1,3-Butadiene, Chromium Hexavalent

Table 5: Commercial Sterilization facilities known to emit Ethylene Oxide located within 5 miles of the boundary of the monitoring area. Data from:
https://www.epa.gov/hazardous-air-pollutants-ethylene-oxide/forms/ethylene-oxide-risk-commercial-sterilizers

Facility Name	Longitude	Latitude
Auris Health	-121.9206	37.3828

Past and ongoing air quality measurements and studies

There are 2 regulatory ambient air monitoring stations in/near San Jose that are used to measure air pollution. One is located at 158 E. Jackson Street in downtown San Jose, near a number of major freeways, the San Jose international airport, and commercial and residential areas. This site serves as an US EPA NCORE site that integrates several advanced measurement systems for particles, pollutant gases, and meteorology and measures O_3, CO, NO_2, SO_2, NO_y, PM_{10}, $PM_{10-2.5}$, $PM_{2.5}$, speciated $PM_{2.5}$, and air toxics. This station has been in operation since October 2002. The second site is located at 1007 Knox Ave. and serves as a near-road monitoring site, designed to characterize population exposures in the near-road environment. This site is 16 m downwind from 10-101, and measures NO_x, CO, $PM_{2.5}$, black carbon, air toxics, and ultra fine particulate matter. The San Jose Knox Avenue station has been collecting data since August 2014. These stations are operated by BAAQMD and are part of the national regulatory network overseen by the USEPA in support of the federal clean air act. The measurements from the stations are intended to represent regional air quality and demonstrate compliance with regional air quality standards.

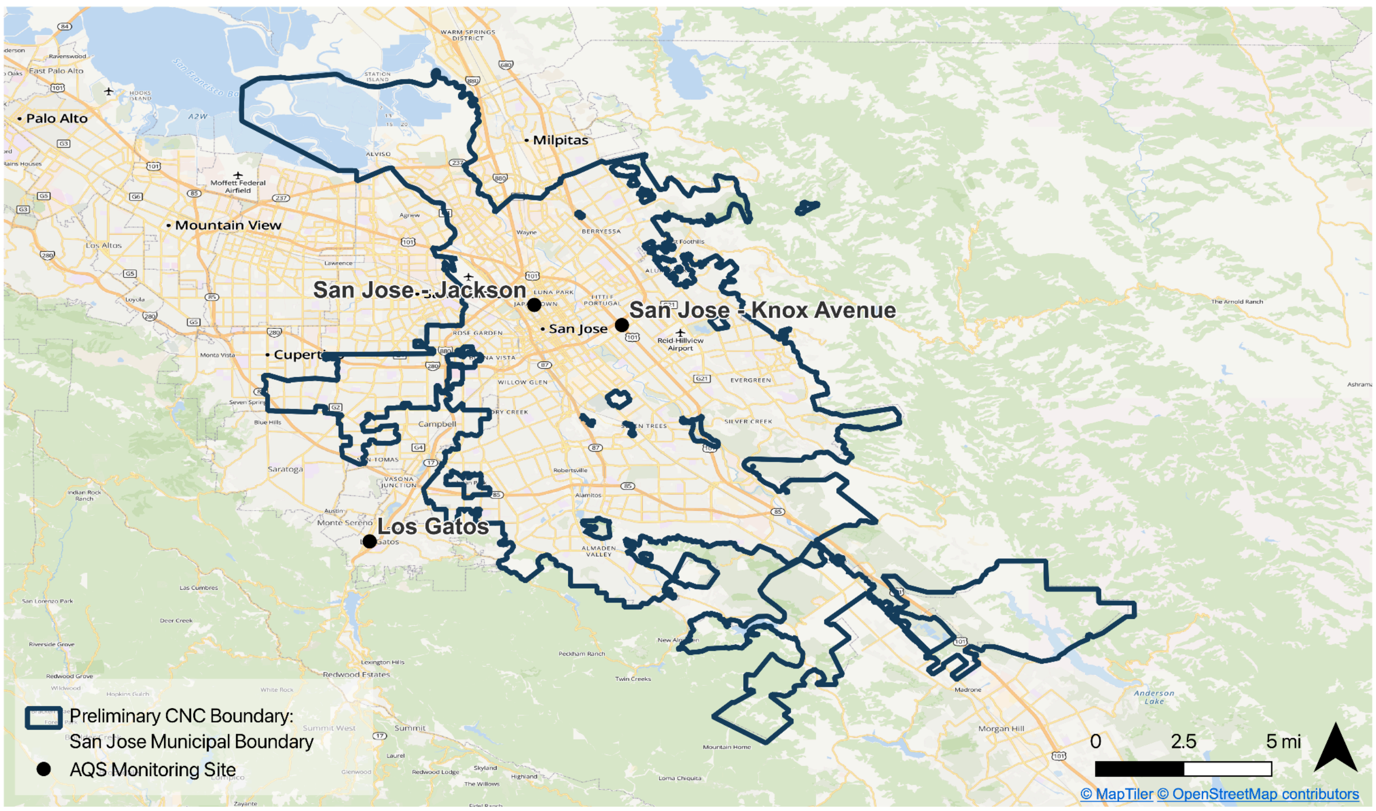


Figure 2: San Jose municipal boundary and local Air Quality System (AQS) monitoring sites.

There has been limited community-scale air monitoring in San Jose. The Bay Area Air District supported an Odor Attribution Study conducted in 2020 and 2021 to identify odorous compounds impacting Milpitas, a city just to the north of San Jose, and found that landfill gas was the primary driver for community complaints along with other sources that also contributed to odors. While this study focused on the Milpitas area, it is likely that residential areas in Northern San Jose are also impacted by these sources.

Acterra has been working on air monitoring and youth engagement efforts in San Jose. In 2022, a YAQA project funded by CARB placed air quality monitors at ten East San Jose high schools and trained nearly 2,000 students in air pollution science, data analysis, and civic engagement. A follow-up Cycle 4 CARB grant in 2024 continues this work, continuing to build community capacity to identify pollution sources and advocate for meaningful change.

Aclima used mobile monitoring to map air pollution in San Jose from March 2020 to February 2021 in cooperation with BAAAMD; the results can be viewed at air.health. The results showed significant spatial variability for pollutants like NO2 and PM2.5, particularly in areas of San Jose near major highways and heavily trafficked roads or regions with significant commercial and industrial activity. However, the suite of pollutants measured by Aclima during that effort did not include key pollutants that support the characterization of specific pollution sources, specifically black carbon, helpful for identifying sources of diesel particulate matter, and TVOCs helpful for identifying stationary sources of VOCs.

2.3 Gaps in air quality information that SMMI will address

The regulatory stations provide valuable data to support a regional understanding of air pollution and support estimates of population exposure. The data from these stations does not commonly capture air pollution at the community scale, however data from the Knox Ave. station at Knox Ave., as a near-road station, should reflect air pollution concentrations near busy freeway corridors. There is limited data on the localized ambient air pollution or exposure in locations with sensitive populations aside from the Aclima data from 2020/2021, and, as mentioned previously, the suite of pollutants measured by the Aclima platform did not include key pollutants that support the characterization of important pollution sources.

San Jose is a large urban area with an airport, many freeways, and a large and varied number of industries. A summary of the air pollution concerns and sources identified by the community, supported by information about major polluting facilities and air toxics hot spots, including:

- Major highway and heavily trafficked roads
- Multiple industrial areas
- Emissions from multiple industrial categories including auto shops, transportation companies, construction, waste processing, and open burning near homeless encampments.
- The San Jose Airport
- Newby Island Landfill
- Monitoring around schools, daycare, and community centers

To provide the type of data necessary to characterize the areas of concern identified by the community and prioritize locations for further plans and community action, the following data gaps were identified:

- Lack of localized air monitoring data in San Jose
- Lack of speciated data on air toxics - both gaseous and particulates - near sources.
- Lack of information on air pollution near sensitive receptor locations like schools, day care facilities, community centers, etc.

This plan proposes to use mobile air pollution monitoring to provide highly spatially resolved pollutant concentration data for the community. The detailed spatial information from mobile monitoring can help identify specific, localized sources of pollution and show how pollutant levels change across and between different neighborhoods. The Aclima Mobile Platform includes an expanded suite of pollutants that support improved characterization of sources including the use of black carbon to diesel particulate matter and TVOCs to indicate areas where toxic air contaminants may be located. Furthermore, the use of the expanded suite of equipment in the Partner Mobile Laboratories enables communities to be monitored for specific toxic air contaminants. The information gathered through mobile monitoring supports the development of pollution reduction plans that can be different for various parts of a community, allowing for solutions that are specifically suited to local needs.

3. Scope of actions

Data gathered by mobile air monitoring can support a wide range of actions by communities and governments to reduce emissions and/or exposure. Examples of possible actions include, but are not limited to:

- Regulatory investigation: where these data identify hotspots that can be statistically attributable to a given source, local and state agencies may decide to do further investigative work that can lead to compliance and enforcement actions (e.g. fines, new emissions control requirements)
- Traffic management strategies: by identifying hotspots caused by vehicular emissions, these data can inform local and state vehicular emissions control strategies, including initiatives like anti-idling enforcements or vehicle emissions inspection programs
- Airport Emissions Studies and Monitoring: Community members expressed interest in ongoing monitoring and publicly available data on airport-related emissions and impacts to health.
- Urban planning: governments can use an understanding of how air quality varies over time and space to direct investment in green spaces or update zoning regulations to restrict certain land uses
- Corporate action: individual companies may be able to use these data to adjust their transportation routes and schedules, or facility operations, to reduce emissions and health impacts
- Modeling and forecasting: mobile air monitoring data can support improved modeling of historical air quality that allows better prediction of future patterns and impacts across a community
- Health risk assessments: where these data identify disproportionate impacts of pollution across the geography of a community, these insights can be used in conjunction with other datasets to assess potential health impacts for communities or identify locations where formal health risk assessments should be performed
- Community action: data provided by mobile air monitoring may be useful to community-based organizations in advocacy work to reduce emissions and/or exposure, including the development of Local Community Emissions Reduction Plans (L-CERPs)

When monitoring has concluded, CARB, Air Districts, community groups, regulatory agencies, researchers, and other parties are encouraged to leverage the data to address specific air pollution concerns.

4. Air monitoring objectives

4.1 Define objectives

The air monitoring aims described in Section 2 can be expanded into two primary **air monitoring objectives**:

1. **Identification and characterization air pollutant emission sources**
   This objective seeks to better understand and characterize sources, which can include the following goals:
   - Identify where pollution is coming from
   - Identify key pollutants coming from a given source
   - Understand what locations in communities are impacted by pollution from a given source
   - Understand how concentrations can vary directly downwind of a given source

- Understand how emissions from a given source may vary by time of day
- Understand how different sources contribute to a given pollutant in the community

2. **Identification disproportionate air pollution impacts**
   Mobile air monitoring can also be used to investigate various objectives focused on understanding the unequal distribution of air pollution within a community:
   - Identify the key pollutants that impact ambient air in a community
   - Understand the typical concentrations of pollutants in ambient air in the community
   - Understand how pollution is distributed across a community
   - Understand how pollution varies in time across a community

These two objectives support investigation of the majority of concerns identified by the community by either characterizing both individual sources (landfills or auto shops) and broader source types (freeway and traffic) as well as the impact of these sources across the community.

4.2 Define mobile monitoring methods to support objectives

Given the gaps identified in Section 2.3 and the community specific air quality concerns, the types of data needed include high spatial resolution data in a wide variety of locations across the community of San Jose, in particular for black carbon, vocs, and specific air toxics. The mobile monitoring approach enables the collection of data at high spatial resolution throughout the community over the entire mapping period. This approach results in measurements of a snapshot of the concentration of air pollutants near to many if not most of the areas of concern identified by the community during the project. The data resulting from mobile monitoring support targeting a wide range of source types within the monitoring area, allowing for flexibility of source analysis without predetermined source selection.

The CAMP will use two mobile monitoring approaches to support project air monitoring objectives - **broad area monitoring** or **targeted area monitoring**. Broad area monitoring supports the air monitoring objectives throughout the entire CAMP monitoring areas over the entire monitoring time period while targeted area monitoring will focus on a subset of specific air pollution concerns with focused driving around those concerns for shorter periods of time.

Broad area monitoring: monitoring vehicles collect data within the entire CAMP monitoring area over an extended time period using the Aclima Mobile Platform. Vehicles monitor on publicly accessible roads, gathering repeat measurements at different times of day, days of the week, and seasons. Broad area monitoring tells us about the typical concentrations of pollutants and locations of persistently high pollutant concentrations throughout the CAMP area over the whole period of monitoring. As an example, Figure 3 shows results of a broad area monitoring approach in San Francisco, displaying typical NO2 concentrations observed over a 1 year time period. Broad area monitoring will occur over a 9 month time period between June 2025 and March 2026.

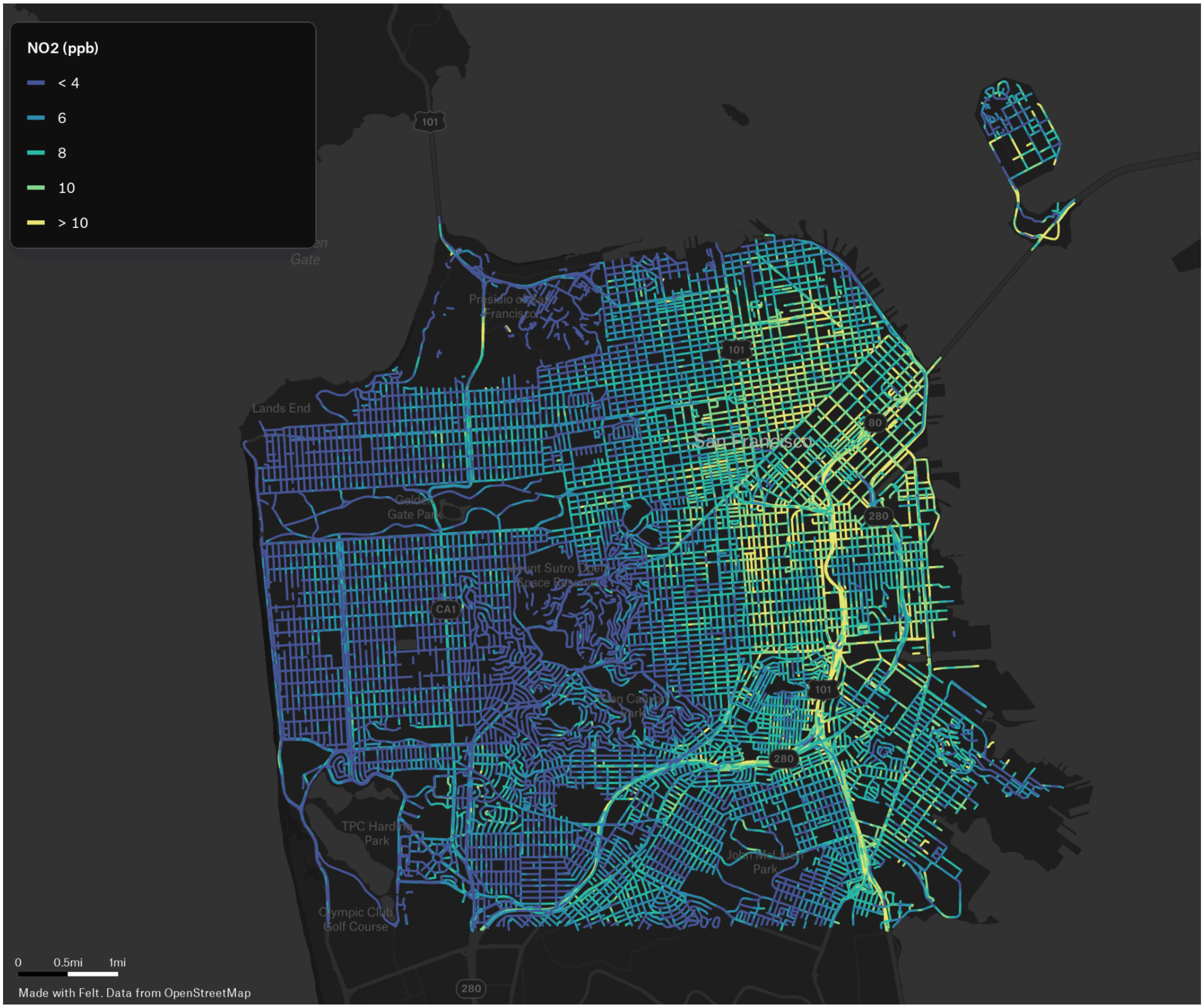


Figure 3: Example of plotted ambient concentration estimates for NO_2 in the San Francisco Bay Area, CA, showing typical concentrations observed over a 1 year monitoring period This example shows how high NO_2 concentrations (as illustrated by the brighter green colors) are disproportionately impacting the eastern parts of the city. This plot uses data generated by the broad area monitoring method.

The suite of pollutants measured by the AMP supports the exploration of many source types identified by the community. Black carbon measured in combination with NO_2 and other combustion related pollutants help identify areas impacted by diesel particulate matter pollution. TVOC data help identify areas where organic toxic air contaminants may be located. Methane and ethane data combined with other pollutants help identify locations of elevated biogenic methane, which can indicate emissions from landfills.

Targeted area monitoring: a subset of monitoring vehicles focuses on specific air pollution concerns (sources or impacted areas) at smaller spatial scales and shorter time periods. This measurement strategy involves monitoring over a relatively small area over a shorter time period with more intensive driving (i.e. more samples in a specific area on any single day). Targeted area monitoring tells us more detail about a specific concern, such as the exact makeup of chemicals being emitted from a particular facility, what areas of a community are most impacted in the immediate vicinity of pollution sources, or what times of day these areas are most impacted. Targeted area monitoring vehicles will either be drawn from the broad area monitoring fleet (Aclima Mobile Platforms) or from a special mobile laboratory fleet (a small number of vehicles with higher accuracy/precision sensors detecting a wider range of pollutants including toxic air contaminants), depending on the specific source of concern. In contrast to the broad area monitoring approach, the number of concerns that can be addressed is much more limited, but the depth at which the data about the concerns can be collected and analyzed is potentially greater.

Targeted area monitoring vehicles can be deployed in different ways to meet different objectives.

- *Fenceline* driving (Figure 4) gathers data systematically on predetermined routes or routes determined in the field according to wind conditions around the perimeter of a known or suspected source facility/site. Fenceline driving can help determine the chemical makeup of emissions from a known source.
- *Transect* driving (Figure 4) follows a path designed to go upwind, through, and downwind of a potential plume of pollution from a known or potential source. Transect driving can help us better understand the chemical makeup of emissions in a plume, and where the plume is impacting in the local community.
- *Pseudo-stationary driving* approximates a more traditional stationary monitoring approach by temporarily stopping a monitoring vehicle within a potential plume of pollution from a known or potential source. Pseudo-stationary driving can help us better understand how pollution from a source varies in time. It can also allow for measurements of certain pollutants where measurement methods require longer sampling times (minutes up to an hour).
- *General Survey driving* is repeated monitoring along a predetermined route or on all roads within a predetermined area, attempting to collect air pollutant data evenly across time

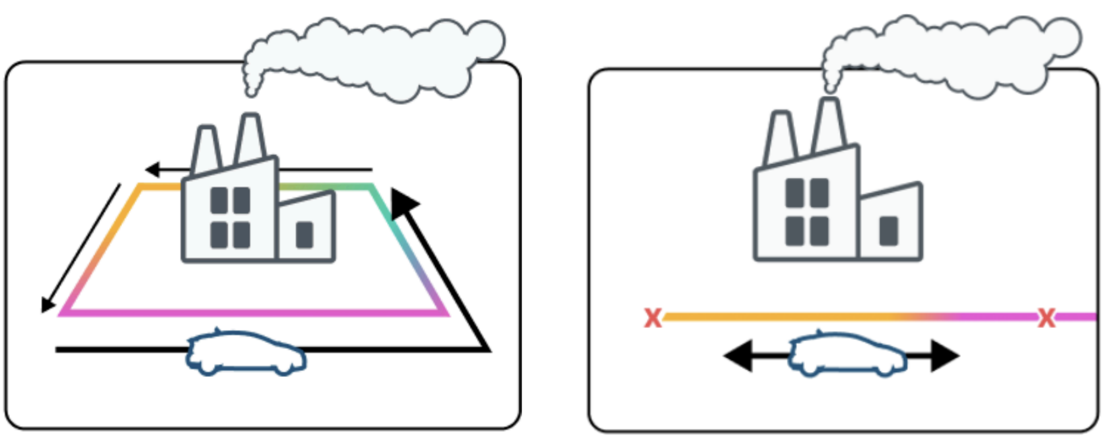


Figure 4: Example measurement technique for targeted area monitoring using (left) fenceline driving systematically surveys around the perimeter of a known or suspected source facility/site and (right) transect driving following a path designed to sample upwind, in, and downwind of a potential plume of pollution from a known or potential source.

Targeted area monitoring for San Jose will be conducted by the Berkeley mobile laboratory and additional information about the targeted area monitoring can be found in Section 8.3. The suite of pollutants for monitoring by the Berkeley mobile laboratory includes various air toxics such as benzene, toluene, and acrolein that are relevant to the mixture of air pollutants expected from the concerns and sources identified in Section 2.

4.3 Community-defined concerns, objectives, and analysis plans

The community engagement process has defined a range of air pollution concerns. These concerns were translated into specific high-level monitoring objectives and sub-objectives, which in turn allowed the selection of appropriate mobile monitoring methods and data analysis plans to collect the type of data needed to address gaps in prior monitoring efforts and to address specific community concerns. Not all concerns and identified pollution sources are assigned specific monitoring objectives. In some cases it is because the measurement methods for monitoring the sources are not available to address the specific pollution sources (for example, the Berkeley mobile laboratory does not have Ethylene Oxide measurement capabilities to make useful measurements around the Auris Health site). More generally, however, it is because resources for targeted area monitoring are limited across the entire SMMI project (64 different communities) and not all concerns can be directly addressed through the targeted area monitoring approach. While the concerns listed below will be the primary focus of the monitoring in San Jose, the final collected data set can be further analyzed beyond the scope of SMMI to address a much wider set of concerns and sources.

Table 6 below provides an outline of the community specific concerns, objectives/sub-objectives, mobile monitoring methods, and data analysis approaches that may support actions to reduce emissions or exposure in a community. More details on the monitoring methods and presentation approaches can be found in Section 8 and Section 13, respectively. The number of concerns identified through the community engagement process was extensive, with many different sources and impacted areas identified. A general survey approach is the most appropriate monitoring design for the number and diversity of concerns, and will be used in both the broad area monitoring and targeted area monitoring.

The primary advantage of broad area monitoring is the ability to collect data over a larger area and in the vicinity of an extensive set of pollution sources with a single monitoring approach. Certain source types such as airports, roadways, and other high traffic areas can be appropriate for broad area monitoring by the Aclima Mobile Platform, which can monitor key pollutants such as black carbon, PM, and TVOCs. The targeted area study for San Jose will also take a general survey approach to collect data around the wide range of sources identified both as community concerns as well as from emissions inventories. Some of the sources and concerns identified are listed in the first row of Table 6.

Table 6: Community-defined concerns, objectives, and analysis plans

Community Concern	Primary Monitoring Objective	Monitoring Sub-objective	Mobile Monitoring Methods	Analysis Approach
Multiple pollution sources including major transportation corridors (I-101, I-280, I-680, and I-880), and industrial sites in the impacted areas in the vicinity of Little Orchard St, Trimble Road and Zankar Road, and other	Characterizing Sources	Key pollutants Pollutant levels Locations impacted	Targeted Area: General survey	Clusters of enhancement detections on a map Chemical speciation bar/pie graph Ambient concentration map of key pollutants

sites listed in Tables 2, 3, and 4 where resources permit.				
The San Jose Airport and Reid-Hillview airport	Characterizing Sources	Pollutant levels Locations impacted	Broad Area Monitoring	Clusters of enhancement detections on a map Statistics on detections
Roadways	Identify Disproportionate Impacts	Locations impacted Pollutant levels	Broad Area Monitoring	Clusters of enhancement detections on a map Statistics on detections Ambient concentration map of key pollutants
Sports and Concert Venues	Identify Disproportionate Impacts	Locations impacted Pollutant levels	Broad Area Monitoring	Clusters of enhancement detections on a map Statistics on detections
Multiple sources and impacted areas	Characterizing Sources	Pollutant levels Locations impacted	Broad Area Monitoring	Clusters of enhancement detections on a map

5. Project roles and responsibilities

The SMMI defines the roles and responsibilities of various stakeholders in the community monitoring. The Community Engagement Plan details these roles and responsibilities and outlines how different groups will work together for community engagement. This section outlines the organizational structure for the SMMI partners (Figure 5), a list of community organizations that are Engagement Leads, and a list of the PEG members (Figure 6). Information on the SMMI project, including links to Engagement Leads, PEG members, and PEG meetings is also available at https://aclima.earth/ca-smmi. Responsibilities for Engagement Leads and PEG members are laid out in Section 1.1 in detail.

CARB's Monitoring and Laboratory Division is responsible for funding, managing and overseeing the project and ensuring it meets all contractual requirements. Aclima is the primary contractor for the project and is responsible for designing and implementing a plan for statewide community engagement, developing CAMPs for all project area communities, deploying mobile platforms to collect data, managing and analyzing data, and developing public reports. CARB and Aclima meet weekly to discuss project updates and ensure the project is progressing.

Based on the project's Community Engagement Plan, Acterra, the Engagement Lead for San Jose, plans and implements community outreach and engagement for the project, with the goal of understanding specific community concerns around air pollution. In addition to the distribution of an air pollution survey, Acterra holds and conducts outreach for two community meetings focused on local air pollution concerns that are tailored to the specific linguistic, cultural, and accessibility needs of the community. Acterra then summarizes community air pollution concerns for Aclima to translate into the CAMP. Community members play a crucial role in providing their knowledge and experiences with air pollution both through participating in the community meetings and through completing the air pollution concerns survey. The Project Expert Group guides community engagement and decision-making throughout the project, meeting eight times over the project period in meetings facilitated by Aclima.

SMMI Partners

Figure 5: SMMI Project Organizational Chart

Community Organizations

Engagement Leads lead and co-manage community engagement efforts in the designated communities

- Acterra
- Breathe SoCal
- Californians for Pesticide Reform
- Canal Alliance
- CCEJN
- Center for Community Action and Environmental Justice (CCAEJ)
- Center on Race, Poverty, and the Environment
- Citizen Air Monitoring Network
- Clean Water Fund
- Climate Action Campaign
- Community Agency for Resources, Advocacy and Services (CARAS)
- Cool OC
- Day One
- El Concilio
- Girl Plus Environment
- Greenbelt Alliance
- HARC, Inc.
- Healthy Fresno Air
- HOPE Collaborative
- Just Cities
- Leadership Counsel
- Los Amigos de la Comunidad
- Madera Coalition for Community Justice
- One Treasure Island
- Our Children's Earth Foundation (for Rodeo Citizens Association)
- Pacoima Beautiful
- Rise South City
- Sacramento EJC
- San Leandro 2050
- SOMCAN
- Sustainable Contra Costa
- Sustainable Solano
- The Niles Foundation
- Tri-Valley Air Quality Climate Alliance
- UNIDOS Network
- United for Justice
- Valley Improvement Projects
- Valley Onward
- Valley Vision

Project Expert Group

A cross-sector group of representatives from local air districts, community-based organizations, academia, and residents from overburdened communities that guides community engagement and decision-making for this project.

- Nader Afzalan
- Stephanie L. Mora Garcia
- Brent Bucknum
- Mikela Topey
- Agustin Angel Bernabe
- Amelia Stonkus
- Anna Lisa Vargas
- Gustavo Aguirre Jr
- Jamallah Green
- Jonathan Mercado
- Ken Szutu
- Lillian Garcia
- Moses Huerta
- Ms. Margaret Gordon
- Brad Dawson
- Kate Hoag
- Lily Wu-Moore
- Payam Pakbin

Figure 6: List of Engagement Lead organizations and PEG members for SMMI

How will monitoring be conducted?

6. Data quality objectives

Data quality objectives are a series of goals set to make sure that the data collected, the analyses performed, and the visualizations produced are of good enough quality to address the stated monitoring objectives. These goals can be related directly to the quality of the measurement method, for example the accuracy or the precision of a sensor. They can also be more qualitative goals that determine how the measurement data is analyzed and visualized to accurately address community air quality concerns without being misleading. Data quality indicators are sometimes included as part of a data quality objective and are specific metrics that can be used to tell how good a measurement is. Some commonly used data quality indicators are data completeness, precision, bias, or limit of detection. Additional information on these and other data quality indicators can be found in Appendices C, D, E, G, and F.

Mobile air quality monitoring enables a variety of high-resolution spatial analyses that support different air monitoring objectives. One output uses time-resolved data from multiple individual drives of the same location to identify areas where pollution concentrations vary substantially and persistently from local background levels, indicating a probable local emissions source. This supports the air monitoring objective of attempting to identify and characterize pollution sources. Another output is the creation of maps of typical air pollution concentrations at block-by-block resolution that show areas of persistently high or low levels of individual pollutants, supporting the air monitoring objective of identifying areas of disproportionate impact.

Different monitoring objectives have different data quality objectives. The two primary monitoring objectives for SMMI and their associated data quality objectives are:

1. **Identify and characterize air pollutant emission sources**

   Typical pollutants of interest: CH_4, C_2H_6, BC, $PM_{2.5}$, PM_{10}, NO, CO, TVOC, toxic air contaminants such as benzene, toluene, acrolein

   Data quality objectives:

   a. Find and map spots where pollution is likely coming from by detecting noticeable spikes in measurement readings that are clearly above normal background levels. More specifically, this means that the spike measurement must have a signal to noise ratio of at least 3.
   b. Make sure that we have high confidence in the locations where pollution emissions sources are detected. In other words, we want to minimize the presence of “false positives” in the resulting data. This is done by making sure that multiple detections of emissions sources occur in the same location before identifying it as a likely source of pollution. This can be quantified as the number of detections per visit to a particular location.
   c. Aclima will monitor and track the performance of each underlying measurement using the following key data quality indicators: gain drift and limit of detection.

2. **Identify disproportionate air pollution impacts**

Typical pollutants of interest: O_3, NO_2, $PM_{2.5}$, BC, toxic air contaminants such as benzene, toluene, and acrolein.

Data quality objectives:

a. Produce an ambient concentration estimate of pollution for the monitoring area by collecting measurements at different times of day, day of week,and across seasons to account for natural variability of pollution levels.
b. Ensure data are spatially distributed throughout the entire user-defined area.
c. Produce concentration estimates at desired and practical spatial aggregation scales (e.g. hexbins, road segments).
d. Include a measure of confidence (i.e. a confidence interval) with each ambient pollution concentration estimate, so users can understand the reliability of the values and whether pollution levels are truly different between locations.
e. Monitor and track the performance of each pollutant measurement using the key data quality indicators of bias, drift, precision

These data quality objectives are largely qualitative goals that provide the foundation for the types of insights that mobile monitoring is designed to support. A critical aspect of quality assurance underlying these objectives is characterizing and maximizing the measurement quality of the air pollution measurements, particularly for the sensors. However, confidence in these data products will depend on a number of additional factors such as mobile monitoring strategy, the number of samples collected for features of interest (i.e. road segment or other spatial length scale), magnitude and variability in pollution concentrations, and meteorology over the contract period.

Data completion is an important quantitative data quality indicator in air quality monitoring as incomplete data can lead to biased conclusions from the data collected. Traditionally, data completeness is quantified across the time dimension, for example, number of data points collected per total time elapsed. With mobile monitoring, in some cases it is more important to quantify data completion in the spatial dimension, for example, total number of data points collected in a specific location compared to an expected number of data points in that location. Aclima's completeness metric for monitoring is discussed in Section 12. For the customized targeted area monitoring, metrics for completion are discussed in Section 8.3. Achieving completion for the monitoring plan relies on individual sensors having high temporal data completeness rates and uptime. Completeness rates of 80% or higher generally allow for efficiently achieving the spatial completeness objectives. If completeness is below 80%, additional driving will be done to compensate in order to meet the monitoring completeness metrics. If this is not possible for specific monitoring objectives, the impact will be detailed in the final report.

The comprehensive quality assurance approach incorporates processes and metrics to minimize uncertainty. Achieving data quality objectives relies on more than just individual indicators, as real-world challenges (e.g., driver absences) and external events (e.g., wildfires) can affect data quality despite a robust QA plan. The primary aim of these objectives is to generate high-quality data with well-defined performance parameters, enabling effective aggregation and analysis of mobile data for informed decision-making and pollution reduction initiatives across various applications. Section 12 details the evaluation of the effectiveness in meeting these data quality objectives.

7. Monitoring methods and equipment

Aclima will deploy two distinct but complementary monitoring methods enabled by the use of a mixed fleet of AMPs and PMLs:

- **Broad area monitoring** collected by AMPs, with mobile monitoring guided by a dynamic algorithm in monitoring areas defined by the community as areas of high pollution concern during community meetings and through survey submissions.
- **Targeted area monitoring** for investigations of specific sources and areas of concern, collected by the Berkeley PML, with mobile monitoring guided by community-defined air quality concerns and monitoring objectives.

7.1 Monitoring equipment

Broad area monitoring as part of this CAMP will be conducted using a fleet of Aclima Mobile Platforms (AMPs, Figure 7).

Figure 7: An Aclima Mobile Platform.

All AMPs have a standardized measurement suite that covers a core range of priority pollutants and greenhouse gases (GHGs) shown in Table 7, operating at a collection frequency of every second (with the exception of ozone which is measured every 2 seconds).

Table 7: Air pollution and greenhouse gas species measured by the AMP.

Pollutant	Measurement Frequency
Carbon Monoxide (CO)	1 sec
Carbon Dioxide (CO2)	1 sec
Nitric Oxide (NO)	1 sec
Nitrogen Dioxide (NO2)	1 sec
Ozone (O3)	2 sec
Methane (CH4)	1 sec
Ethane (C2H6)	1 sec
Total Volatile Organic Compounds (TVOC)	1 sec
Fine Particulate Matter	1 sec
Black Carbon	1 sec

Experienced scientists from academia and industry will be deploying 3 Partner Mobile Laboratories (PML) that are equipped with instruments that measure a wide set of speciated air toxics. The PMLs are research groups from UC Berkeley, Aerodyne Labs, and a consortium including researchers from UC Riverside, Baylor University, and University of Houston. Each vehicle is custom-built with different specifications and instrumentation. All 3 vehicles sample in real time with sample time ranging from 1 second up to 30 minutes, depending on the instrument. A full list of PML instrumentation and pollutants measured is available in Appendix I.

For San Jose, the Berkeley PML will be conducting the targeted area monitoring. The Berkeley mobile air quality monitoring platform is based on a Ford Transit 250 medium roof van and is crewed by a driver and a passenger. The platform consists of a number of instruments to measure both criteria and hazardous air pollutants, in both the aerosol and gas phases, as well as other meteorological and state parameters. The gas-phase instrument package measures ozone (2B Tech 211G), carbon monoxide and N_2O (Aeris MIRA Ultra CO/N_2O), methane and ethane (Aeris MIRA Ultra CH_4/C_2H_6), nitrogen monoxide and oxides of nitrogen (NO_X, Ecophysics nLD 855), nitrogen dioxide through two different methods (Ecophysics nLD 855 and Aerodyne Cavity Attenuated Phase Shift Spectrometer [CAPS]), carbon dioxide (Licor LI-7200 RS), and water vapor (both Aeris MIRA Ultras and the Licor). Additionally, volatile organic compounds, e.g. benzene, toluene and more (see CAMP Appendix G.2 for full list) are measured using an Aerodyne Vocus proton transfer reactor time of flight mass spectrometer (Vocus PTR-TOF-MS). The aerosol-phase instrument package includes measures of total suspended particulates (TSI wCPC 3789), particulate matter loadings ($PM_1/PM_{2.5}/PM_{10}$, Palas FIDAS), and black carbon through two different methods (Magee Aethelometer AE33 and Droplet Measurement Tech. Photoacoustic Extinctiometer). Incoming solar radiation is reported by a solar radiation sensor (MetOne Model 094). An Airmar 200WX is used for meteorology including temperature, humidity, pressure, wind speed and direction. A GPS unit (ublox M8Q) provides location and position information.

7.2 Monitoring methods - broad area monitoring

In broad area monitoring, Aclima's fleet of Mobile Platforms will collect data within the community defined monitoring area boundary. AMPs will measure on publicly accessible roads within this boundary, gathering repeat measurements at different times of day, days of the week, and seasons.

Aclima will conduct monitoring within the defined boundary such that the fleet will complete an average of 20 repeat measurements distributed across all residential and major roads in all census block groups to provide adequate coverage throughout the monitoring area. However, rather than specify the number of samples on any specific length of road within each census block group, Aclima uses a dynamic mobile sampling algorithm that is updated daily with the specific goal of collecting data that will maximize improvement in the characterization of a location's air quality. This approach ensures that sufficient measurements are collected in areas where greater pollutant variability requires additional sampling to achieve representativeness, or measurements that are representative of the conditions across the specific monitoring period. The system uses observed data in combination with predictive models to prioritize data collection where there is specific need based on observed characteristics like a large mis-match between the expected and observed air quality at a location, a relatively small amount of data collected to date, a need for a greater density of data collection at a specific location based on an identified community need, and other air quality considerations.

The mobile sampling algorithm ensures sufficient data collection to support the calculation of spatially resolved ambient concentration estimates. In addition, the method supports source identification and assessment of disproportionate impacts by directing more sampling either in regions where there is larger variation in pollution concentrations or around locations of interest for the community. For a detailed discussion of the broad area mobile monitoring and the dynamic mobile monitoring algorithm, see Aclima's QA documentation in the Appendices C, D, and E.

The broad area monitoring boundary for San Jose is shown in Section 8: Monitoring Areas.

7.3 Monitoring methods - targeted area monitoring

UC Berkeley will conduct targeted area monitoring that focuses on specific air pollution concerns at smaller spatial scales. This involves monitoring over a relatively small area over a shorter duration in time (approximately 1 to 2 weeks or less) and is designed to complement the broad area monitoring coverage by providing more in-depth information about a specific area of concern. This can provide both enhanced characterization of pollution sources as well as an assessment of the locations of concern and sensitive receptors in the community that are impacted by source emissions. Targeted area monitoring is designed to perform detailed chemical, temporal, and/or spatial characterization at a select number of locations of concern identified by communities. The characterization can include aspects such as denser temporal information about pollutants by time of day, detailed chemical speciation around sources of concern in a particular area, or spatial information about the location of an emission source and extent of the areas and people impacted by the source.

The mobile monitoring method for targeted area monitoring is different from that used for broad area monitoring. By the nature of targeted area monitoring, a more customized driving method is necessary to support air monitoring objectives and concerns specific to individual communities. As with the broad area monitoring, representativeness is achieved by conducting repeat measurements to sufficiently characterize pollutant concentrations; however, the repeat measurements will typically (though not exclusively) occur over a more condensed time period in these targeted investigations.

Section 8 (Monitoring Areas) details the targeted area monitoring study that will be conducted in San Jose.

7.4 Strengths and limitations of mobile monitoring

Because of the nature of mobile monitoring and how it differs from stationary monitoring, there are inherent strengths and limitations to the approach.

- Mobile monitoring can cover more area at a higher spatial resolution than stationary networks (i.e. fewer spatial gaps in coverage). However, because mobile monitoring vehicles can only spend a limited period of time at a given location, there may be gaps in time for that location where monitoring data is not available.
- Mobile monitoring sensors and instruments can gather valid data on a wide variety of important pollutants for informing community action, but to achieve high spatial resolution, gather data on fewer pollutants and at lower precision and accuracy than is possible in stationary networks. As a result, mobile monitoring sensors are not certified by the U.S. EPA for gathering data that can be compared against national ambient air quality standards (NAAQS) and used in regulatory actions under the Clean Air Act. For certain regulatory actions, a follow-up study using U.S. EPA-approved monitoring methods may be necessary.
- While mobile monitoring can provide a significant amount of information across a given geographic area, monitoring vehicles may be present in that area for a limited period of time. This may mean rare events or seasonal patterns are not captured in the dataset.

8. Monitoring Areas

8.1 Community Mileage Allocation

A requirement for SMMI is that at least 50% of the population in the areas monitored are living in areas designated as Disadvantaged Communities (DAC), as defined by the top 25% of CalEnviroScreen scores under SB535 . Across all CNCs designated for monitoring as part of SMMI, the total population is approximately 7.9M people, of which 2.9M people live in DACs (approximately one quarter of the California-wide DAC population). Aclima's monitoring resourcing scales with the length of roads contained within the selected monitoring area; in other words, more vehicles and drivers are required to monitor areas with a higher total length of roads. For all CNCs combined the total contained road length is approximately 18,000 miles[1]. The DAC census tracts combine to about 6700 miles. Aclima determined that allocating resources for SMMI such that approximately 12,000 miles of roads could be covered would allow for covering the DAC communities while also keeping the total % of DAC population at 50% or above, whereas adding additional resources would reduce the percentage of DAC population receiving monitoring resources. The implication of this is that because not all communities will receive monitoring resources to cover the entire community, an equitable process for allocating monitoring resources per community would need to be developed that would ensure that communities with higher proportions of DAC population will receive more monitoring resources. In consultation with the Project Expert Group (PEG), Aclima developed a method for allocating monitoring resources for broad area monitoring across the 64 CNCs that are part of the SMMI. The approach involved 3 steps:

1. The total number of available road miles was distributed across air districts according to the proportion of population contained within the CNCs in each of the 5 air districts containing the 64 CNCs (Imperial County,

[1] Only major and residential road types are considered in estimates of monitoring area road miles for resourcing purposes; however, all accessible road types, which includes major, residential and highways/freeways, will be driven.

South Coast, San Joaquin Valley, Sacramento Metro, and Bay Area)[2]. This resulted in 100% of the road miles for CNCs in Sacramento, San Joaquin, and Imperial County Air Districts being allocated, because the proportion of these air districts population is higher than their proportion of the CNC road miles compared to that over all CNCs. For the Bay Area and South Coast CNCs, there were more miles present within the CNCs than there were miles available, and therefore a method was required for allocating the remaining miles among individual CNCs.

2. A customized prioritization metric for each census tract across all CNCs was defined to rank CNCs according to various socioeconomic and environmental indicators. This prioritization method was defined in consultation with the PEG. A description of how this prioritization metric was defined is given below.
3. Individual census tracts within CNCs were successively selected based on this customized ranking until the total road miles available for monitoring in each air district was exhausted. The road mile length of the census tracts selected is added up for each CNC, and that total is the number of miles available for monitoring for that CNC. The total number of miles assigned to each community by this method is presented in Appendix B.

The prioritization metric was created as an alternative to the CalEnviroScreen (CES) score, addressing concerns raised by the PEG about the relevance of many of the metrics used in CalEnviroScreen as applied to the SMMI. Note that because the DAC communities are defined based on CES (under SB535), the PEG's prioritization metric will result in some non-DAC communities being prioritized over DAC communities. The methodology Aclima used, in coordination with the PEG, is outlined below.

- Aclima proposed a customized weighting of individual environmental and socioeconomic indicators relevant to the SMMI monitoring methodologies (including some in CalEnviroScreen plus others). The weighting was determined by a survey of PEG members, who assigned weights to each available indicator.
- Survey Score Normalization: The Max/Min method was used to normalize the survey responses from PEG members to a scale of 0 to 1. This ensured that individual respondents' tendencies to give consistently higher or lower ratings did not skew the overall results.
- Indicator Weighting and Scoring: The normalized raw survey results were used to create weighting factors for each indicator. These weighting factors are shown in Appendix B. For each census tract, a mileage allocation score is derived by converting each indicator value into a percentile rank across all census tracts contained in the CNCs. This rank is multiplied by its corresponding weight, summing across all indicators, and normalizing to a value between 1-100. The indicators were taken from CES 4.0 and two additional non-CES indicators were added: the density of AB2588 Air Toxics Hot Spots and the density of large permitted sources, both measured as the number of sources per unit road length in census tracts. Some of the sources in the inventory had no emissions reported; these sources were first removed before calculating the density of sources.
- Final Score Calculation: The weighted scores for each indicator were summed for each census tract. This summed result was then normalized to a scale of 1-100 to create a PEG mileage allocation score for every census tract contained within the 64 CNCs. The final indicators and scores are available in Appendix B.

While this approach resulted in census tracts with the highest prioritization scores being prioritized within CNCs for the purposes of mileage allocation, the Community Engagement Plan (Appendix A) outlined a process for the

[2] The populations used for each Air District in this calculation are: Bay Area - 2838232; Imperial - 15330; Sacramento Metro - 138633; San Joaquin Valley Unified - 687473; South Coast - 4573865.

Engagement Leads to work with communities directly to use the road mileage budgeted to select monitoring boundaries according to the priorities indicated by the communities. While this process empowers the local communities to make the decisions about where to direct monitoring, it should be acknowledged that the final monitoring area boundaries may not necessarily include the most disadvantaged communities as defined by established metrics such as CalEnviroScreen or by the PEG-developed metric.

For San Jose, the total road length (for residential and major roads only) within the community is 2206 miles, and the allocated mileage is 1037 miles, as determined through the process above.

8.2 Broad Area Monitoring Coverage

Aclima's vehicles will gather detailed location-based and time-based pollution measurements throughout the community. This will happen over a nine-month period as the vehicles drive on roads that are open to the public. The specific neighborhoods where this mobile monitoring will take place were decided by the community members themselves during meetings led by the Engagement Leads. Broad area monitoring will occur consistently across a 9 month period from June to March, with repeat frequency in all locations on average approximately once every 2 weeks.

The maps below identify the region selected by the community for broad area monitoring along with location characteristics about known air pollution sources and community-identified concerns. Meteorological data (wind speed and direction) will be collected on the mobile platform and will be an additional location based characteristic for incorporating into analysis and interpretation of data.

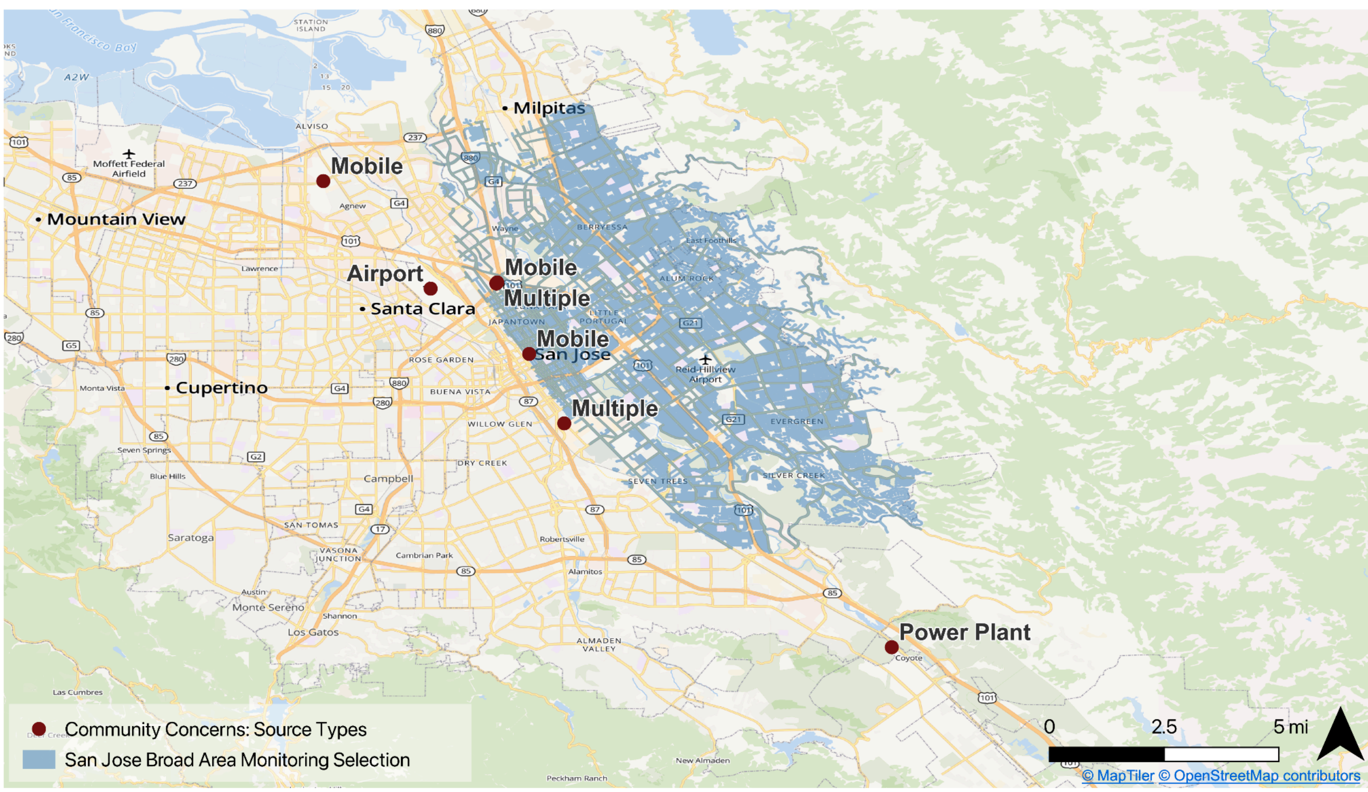


Figure 8: Map of San Jose's final community Broad Area Monitoring selection and local air quality community concern types. Concerns noted by San Jose community members include mobile sources such as traffic congestion

around highways, industrial facilities, event centers, and air pollution from operations at San Jose International Airport. Stationary source concerns were also provided, including auto shops, waste management and recycling facilities, and other industrially-zoned areas.

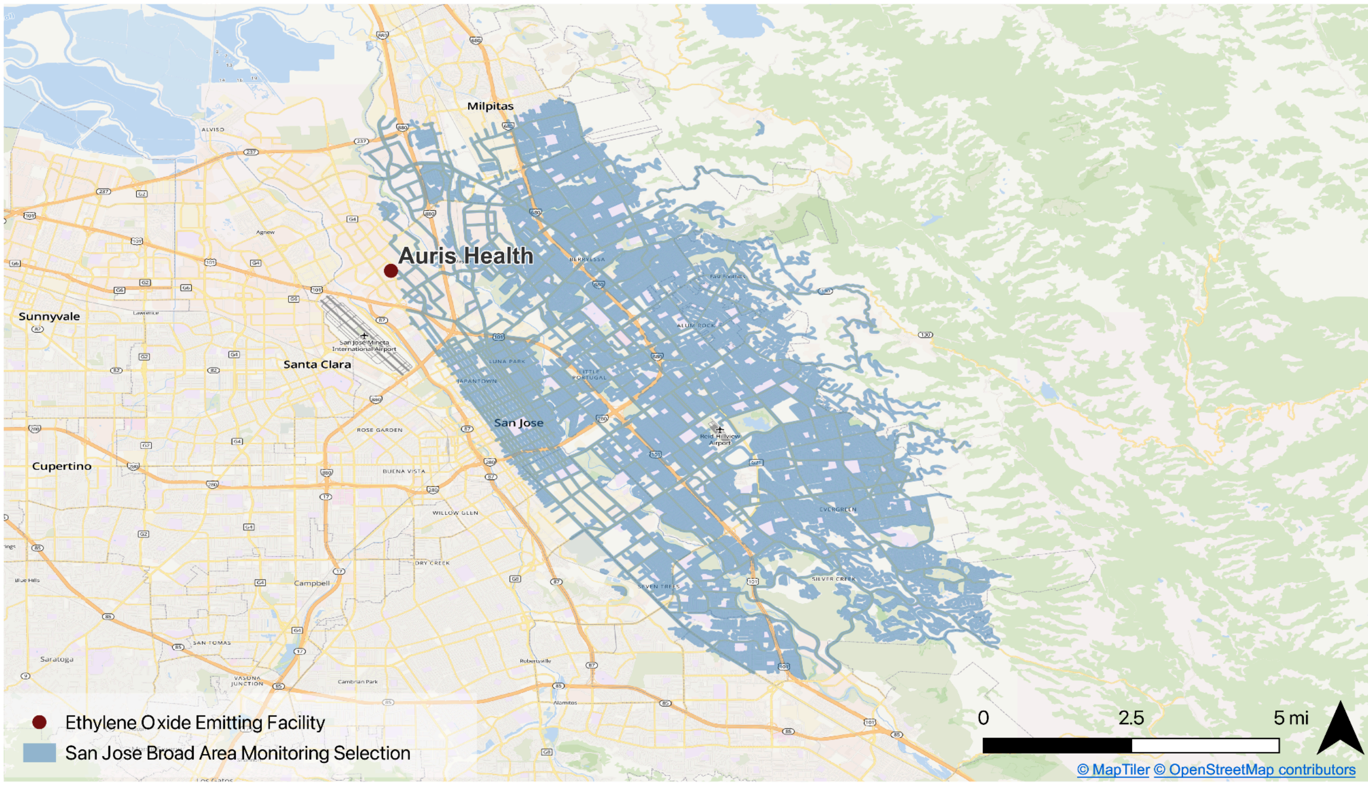


Figure 9: Map of San Jose's final community Broad Area Monitoring selection and Auris Health, a nearby ethylene oxide (EtO)-emitting commercial sterilization facility.

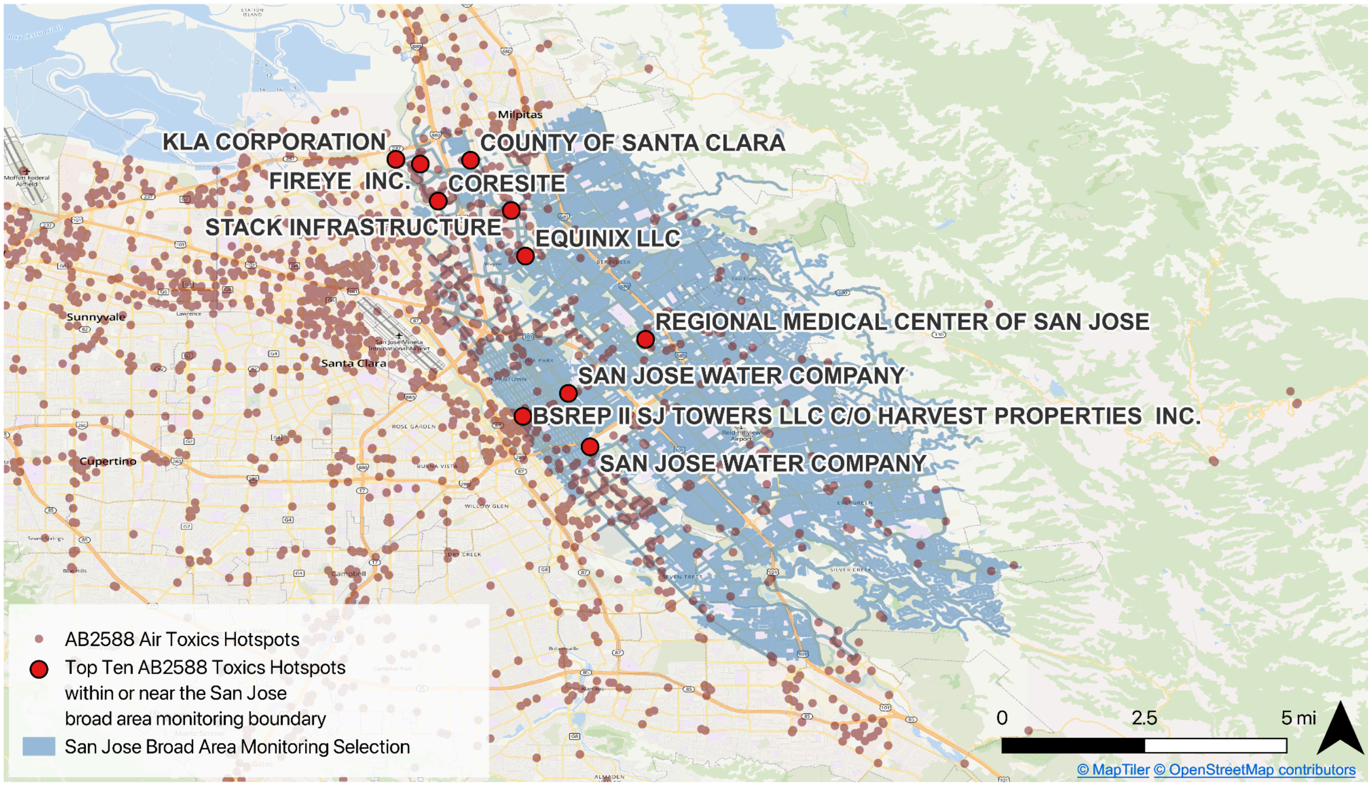


Figure 10: Map of San Jose's Broad Area Monitoring boundary and nearby AB2588 Toxics Hotspots, with emphasis on the top ten AB2588 Hotspots local to this CNC. The top ten hotspots have reported emissions of Diesel Particulate, VOCs, such as benzene and formaldehyde, and metals including cadmium, hexavalent chromium, and lead.

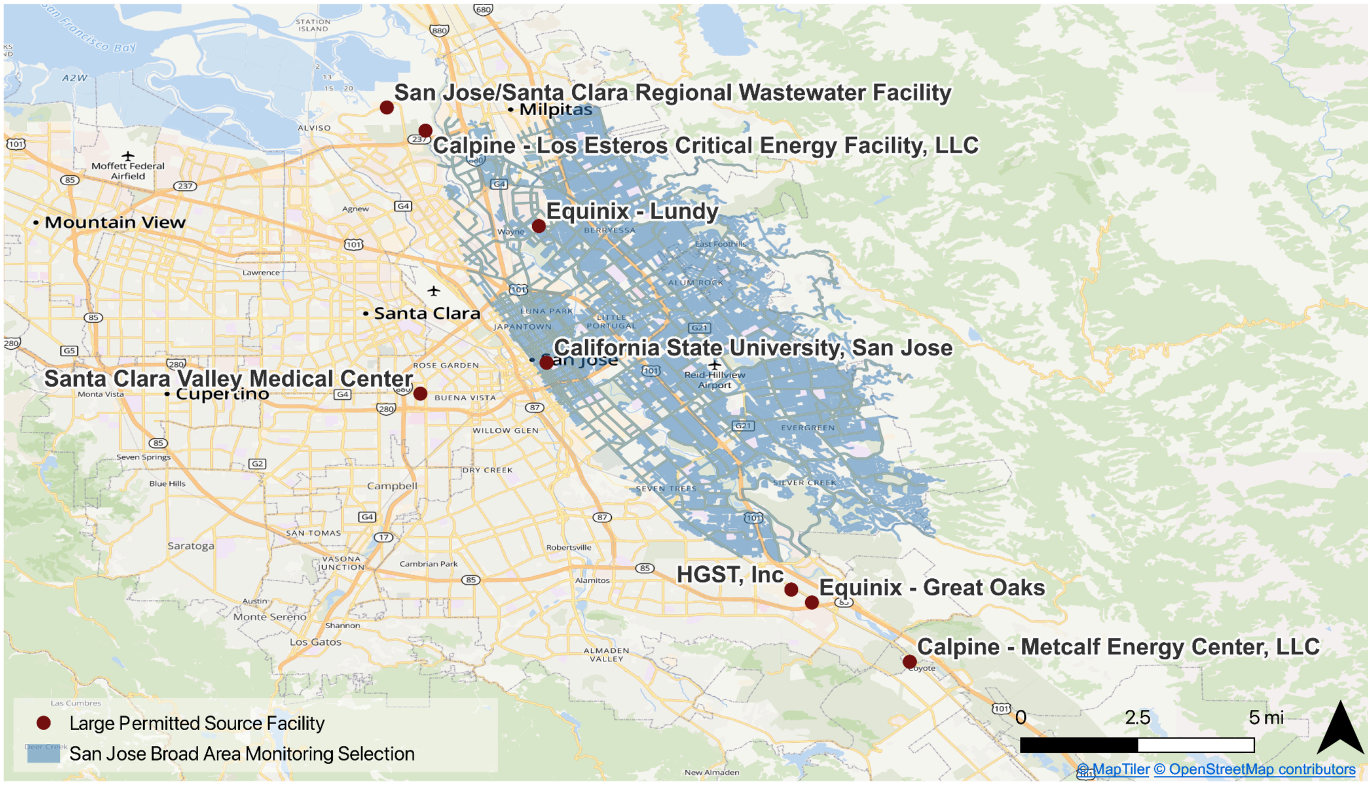


Figure 11: Map of San José's broad area monitoring boundary and local, large permitted source facilities within San Jose's municipal boundary. Facility activities include power generation from fossil fuels and other sources, sewage treatment, as well as manufacturing of computer storage devices.

8.3 Targeted Area Monitoring

Targeted area monitoring studies are designed to flexibly address specific air quality concerns raised by communities. The monitoring method, data analysis approach, and visualization approach will be customized to collect, visualize, and interpret the data in a way that is most effective for providing results that can ultimately be used to take action to address the air pollution concern. Aclima and the PMLs, with guidance from the PEG, have developed a method that draws from a modular set of predetermined monitoring, analysis, and visualization approaches that can be combined in unique ways to address a number of different concern types and monitoring objectives.

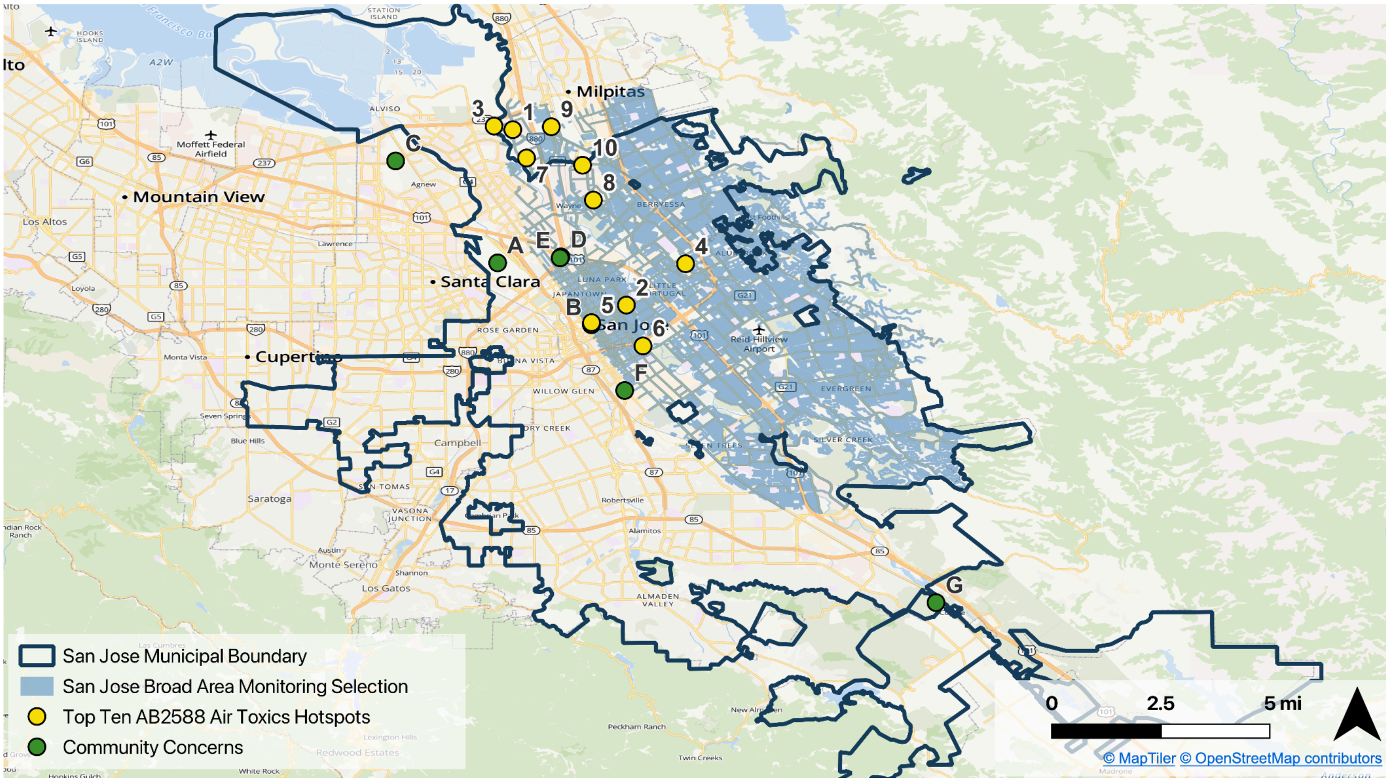
The air quality survey, community meetings conducted by ELs, and other outreach conducted with community members and air district representatives identified and prioritized the community air quality concerns (detailed in Section 2.3).

From the concern and monitoring objectives, a monitoring, analysis, and visualization approach is selected that is most appropriate for providing actionable results to help address the community air quality concerns.

The targeted area study for San Jose will be conducted by the Berkeley mobile laboratory and will address the community identified concerns about multiple different pollution sources including major transportation corridors and various industrial sources. The primary monitoring objective for this targeted area study is to characterize the location and type of pollution coming from the various sources in this area. As a secondary focus, the data collected may also be able to identify locations of disproportionate impact. Some of the pollution source types identified as being important in this area include vehicle emissions, freeways (I-101, I-280, I-680, I-880), and diesel trucks, industrial emissions, and landfill emissions. Some of the key pollutants that will be of focus include TVOC, Methane/Ethane, air toxic, odorous VOCs , black carbon, PM2.5, CO, and NO2. This targeted are study will be conducted using the following monitoring approaches:

- **General Survey** Repeated monitoring along a predetermined route or on all roads within a predetermined area, attempting to collect air pollutant data evenly across time.

The Berkeley Mobile Lab will monitor San Jose by performing a general survey of areas immediately around the identified community concerns and the top 10 air toxic hot spots. Additionally, transects of major roads throughout the entire community will be performed. This will address high emitting source concerns as well as producing multiple background measurements for the area. A drive plan will be constructed such that each targeted area/road is able to be measured within approximately 8 hours. This drive plan will be repeated at least 5 times between June 2025 and February 2026 with the starting location and pathing staggered such that repeat measurements of sources are completed at different times of the day to build up statistics. The route plan can be subject to change since the Berkeley Mobile Lab is piloted by an experienced team of atmospheric scientists, and routes are selected live according to incoming data streams when monitoring within community boundaries. This means that although the exact pathing of a drive can be altered on-the-fly, a drive will not be marked "completed" until a general survey around the identified community concerns/toxic air hotspots is performed. Some drives may therefore take longer than 8 hours or may need to be repeated if particularly interesting data are observed that require leaving the target area. Aclima and the Berkeley team will be in touch with the San Jose engagement leads when plans are finalized in order to alert the community. Community specific information about the local concerns and sources as well as the accessibility of certain roads can be discussed at this point in order to inform the mapping routes.



Label	AB 2588 Facility Name / Community Concern Type	AB 2588 Description / Concern and Location Details
1	Fireye Inc.	Computer Programming Services/Business Services/Computer/Data Processing Svcs/
2	San Jose Water Company	Water Supply/Electric,Gas,Sanitary Services/Water Supply/Water Supply
3	Kla Corporation	Instru To Measure Electricity/Instruments & Related Products/Measuring/Controlling Devices/Instruments For Measuring...
4	Regional Medical Center Of San Jose	General Med/Surgical Hospitals/Health Services/Hospitals/Gen Medical,Surgical Hospitals
5	Bsrep II SJ Towers LLC C/O Harvest Properties Inc.	Real Estate Agents/Managers/Real Estate/Real Estate Agents, Managers/Real Estate Agents And Managrs
6	San Jose Water Company	Water Supply/Electric,Gas,Sanitary Services/Water Supply/Water Supply
7	Coresite	Data Processing & Preparation/Business Services/Computer/Data Processing Svcs/Data Processing Services
8	Equinix LLC	Telephone Comms, Exc Radio/Communications/Telephone Communications/
9	County Of Santa Clara	General Government, NEC/Exec,Legislative,General Gov./Other General Government/Other General Government
10	Stack Infrastructure	Computer Related Services, NEC/Business Services/Computer/Data Processing Svcs/Othr Computer Relatd Services
A	Specific facility	Airports
B	Mobile Sources	Roadways
C	Mobile Sources	Sports and Concert Venues
D	Specific facility	Multiple Traffic and Transportation Corridors: San Jose is a major freeway intersection. There were a lot of concerns about vehicle emissions, freeways (I-101, I-280, I-680, I-880), and diesel trucks. Specific areas: Near highways, Knox Ave, and around downtown and North San Jose.
E	Impacted Areas	Multiple sources and impacted areas
F	Many pollution sources - which are most impactful	Industrial sites in San Jose
G	Specific facility	Power plant (Metcalf Energy Center)

Figure 12: Map showing general area for the targeted area study. Green circles show locations of community concerns while yellow circles show Air Toxics Hot Spots. Actual drive plan and extent of monitoring is to be determined based on conditions experienced during the monitoring period.

9. Quality control procedures

Quality control procedures are an important part of all air monitoring plans because they outline the work that will be done before, during, and after the measurement period to make sure that the data collected meet our data quality objectives.

9.1 Aclima's Quality Assurance and Quality Control Procedures

Aclima has a comprehensive set of quality control (QC) procedures in place throughout the entire monitoring process, from the moment the sensors are installed into vehicles up until the final data is analyzed. These procedures help us track and minimize uncertainty, ensuring that the data collected is appropriate for the intended monitoring objectives. The following is a brief overview of these procedures. A full description of these procedures is included as accompanying documents in Appendices C, D, and E, including the frequency of QC checks conducted.

Ensuring Sensors Measure Accurately: Calibration

Calibration is a critical part of our quality control process. We compare our sensors against trusted reference instruments and standards to make sure they are reporting the correct pollutant levels. We do this at several stages:

- **Before Deployment (Pre-deployment Calibration):** Before our mobile monitoring vehicles start collecting data in the community, each sensor undergoes a thorough calibration process.
- **During and After Deployment (Calibration Check):** During and after a mobile monitoring period, the sensors are brought back to our calibration facilities and recalibrated using the same methods as before deployment. This helps us see if the sensors have drifted or changed their readings during the monitoring period. Calibration checks will occur approximately once every 6-8 weeks over the 9 month monitoring period.
- **Addressing Calibration Drift:** If we find that a sensor's calibration has shifted between any two calibration events, we carefully review the data and may apply adjustments to ensure the accuracy of the measurements taken during the monitoring period. The way we correct for drift depends on the pollutant and the type of data product (e.g., long-term averages vs. short-term spikes).

Ongoing Checks During Monitoring:

There are several ongoing checks that occur while mobile monitoring vehicles are in the field:

- **Driver Checks:** Our trained drivers perform daily visual inspections of the monitoring system, including checking sample lines and performing **PM zero checks** to ensure the system is operating correctly. They also monitor data connectivity and clean the black carbon sensor inlet.
- **Automated System Checks:** Our mobile platform continuously monitors various **system status indicators**, such as temperature, pressure, humidity, and flow rates within the sensors. If these indicators fall outside of acceptable ranges, the data is automatically flagged for review. This helps us identify potential issues early on.
- **Manual Data Review:** Our technical staff remotely monitor the incoming data and system diagnostics on a weekly basis to look for trends, unusual patterns, or potential sensor issues that automated checks might

miss. We may compare our data to that from nearby regulatory air monitoring stations to provide context for how pollutants are generally behaving over time in the region.

Addressing and Correcting Issues:

If any issues are detected during our quality control checks, we have the following procedures in place to address them:

- **Troubleshooting and Repairs:** For minor issues, drivers may be able to perform simple repairs in the field. For more complex problems, sensors or even the entire Aclima Mobile Node (AMN) may be returned to our calibration facilities for repair, recalibration, or replacement.
- **Data Flagging and Exclusion:** If we identify data that is likely inaccurate due to a sensor malfunction or other issue, we flag this data in our system. Severely compromised data is excluded from further analysis to prevent it from affecting the final data products. Data that may have slightly higher uncertainty is noted and may be handled with more caution. Both the severity and the reason for flagging will be indicated
- **Data Adjustments:** If a calibration check reveals a consistent drift in a sensor's readings since the previous calibration, we may apply adjustments to the data collected during the deployment to improve its accuracy over that time period. All data modifications are carefully tracked in our database. During calibration checks, the sensors also undergo recalibrations to derive the next set of calibration parameters for the next phase of data collection.

Table 8: Summary of Aclima QC Procedures and Frequency

Quality Control Activity	Frequency
Driver system checks (PM zeros, data connectivity, tubing and cable checks)	Daily
Manual data review	Weekly
Calibration checks (and subsequent recalibration)	Every 6-8 weeks
Routine Maintenance (internal filter or other consumables swaps, leak checks)	Every 6-8 weeks at calibration checks
Installation and Uninstall Checks (Flow checks, sample line cleaning, sample line filter swaps, etc)	Every 6-8 weeks at calibration checks
On-demand maintenance	As needed

Collocation of Aclima AMN at Regulatory Sites

Aclima AMNs will be installed at between 1 and 3 regulatory monitoring sites operated by CARB or local air districts across California for long term intercomparisons in order to directly compare Aclima's measurements to regulatory measurements. These intercomparisons will be evaluated and quantified using various Data Quality Indicators (DQIs) (e.g. bias, precision, mean bias error, R2, etc). As of the publication of this CAMP, an AMN has been installed at a regulatory site in Sacramento (Downtown Sacramento – T Street, 1309 T Street, Sacramento, CA) and an installation is planned for a regulatory site in Fresno (Fresno – Garland, 3727 N. 1st Street, Ste. 104, Fresno, CA).

Documentation and Oversight:

Aclima maintains detailed records of all our quality control activities. This includes calibration records, maintenance logs, data review notes, and any data adjustments made. Our Quality Assurance Manager is responsible for overseeing our quality assurance system, ensuring that our procedures are followed and that our data meets high quality standards. Results from calibration records will be summarized in the project final report.

9.2 Partner Mobile Laboratories Quality Assurance and Quality Control Procedures

The Berkeley PML QA/QC process includes weekly calibrations of gas-phase instruments using certified gas standards, and weekly baseline readings for particle-phase instrumentation. Data recovery is targeted at 90% for each day or drive, with repeats conducted if recovery goals are not met. Precision, measured through span checks and relative standard deviation comparisons, and accuracy, assessed through instrument responses to known gas concentrations, are regularly monitored and reported. Any significant change in precision or accuracy triggers a full diagnostics check. Table 9 shows the QA activities and their frequency. Additionally, data are continuously reviewed during acquisition for potentially problematic data records through instrument alarms. These alarms are flagged and recorded with a corresponding indication of whether the data is impacted or not. Data that are deemed faulty, either by automatic alarms or manual review, are flagged in the transmitted files.

A full description of these procedures are included in an accompanying document in Appendix G.

Table 9: Summary of Berkeley QC Procedures and Frequency

Quality Control Activity	Associated Instrument(s)	Frequency
VOC gas blend of 1 ppm 1,3-butadiene, 1,3,5-trimethyl benzene, 1 ppm acetaldehyde, 1 ppm acetone, 1 ppm acrylonitrile, 1 ppm ethanol, 1 ppm hexane, 1 ppm isoprene, 1 ppm limonene, 1 ppm m-xylene, 1 ppm methyl ethyl ketone, 1 ppm methyl vinyl ketone, 1 ppm toluene	Vocus PTR-TOF-MS	1x Weekly
5 ppm NO	CAPS NO_2 and Ecophysics $NO/NO_2/NO_x$	1x Weekly
1.9 ppm CH_4, 400 ppm CO_2, 0.1 ppm CO	Aeris CH_4/C_2H_6, Licor CO_2, Aeris CO/N_2O	1x Weekly
30 ppm CH_4, 1 ppm C_2H_6, 2000 ppm CO_2, 10 ppm CO	Aeris CH_4/C_2H_6, Licor CO_2, Aeris CO/N_2O	1x Weekly

10. Data management

The section briefly outlines how Aclima's system manages data from Aclima Mobile Nodes (AMNs) and Partner Mobile Laboratories (PMLs) throughout the SMMI campaign, fulfilling specific Scope of Work elements related to data management procedures and transfer mechanisms. A detailed description of Data Management can be found in Appendix F.

10.1 Data categories and levels

Data collected as part of this CAMP will range from 1-second measurements used for analysis, combinations or summaries of data collected throughout the observation period, and more rapid alerts of the detection of high concentrations. Aclima organizes these data further into levels reflecting the degree of processing, from the lowest level (Level 0, or L0) at sensor readout to high level (Level 4, or L4) modeled analyses which synthesize individual data points into actionable insights and data summaries for dissemination through visualization and reporting.

Table 10: Aclima's Data Processing Levels. Asterisks (*) indicate data levels provided to CARB or in support of non-scientific communication and community visualization.

Data Level	Name	Definition	Example
0	Raw Signal	Original signal produced by the sensor.	Voltage, digital number, raw mass spectra data
1	Intermediate geophysical quantities	Derived from Level 0 data using basic physical principles or calibration equations.	Concentration in ppb or ug/m3
2a*	Standard geophysical quantities	Estimate using sensor plus associated physical measurements directly related to measurement principle.	NO2 derived from O3 and Ox (O3+NO2) Temperature and humidity correction to sensor estimates. Methane and speciated air toxics peaks derived from time series data.
2b	Standard geophysical quantities, extended	Level 2a but using external data sources for artifact correction & directly related to measurement principle.	Not planned for use in the SMMI effort.
3*	Advanced geophysical quantities	Aggregated geospatial products using standard statistical methods.	Basic average concentration maps. Maps of enhancement events.
4*	Spatially continuous geophysical quantities, modeled spatio-temporal phenomenology	Aggregated geospatial products using advanced statistical models and potentially external data	Statistically reconstructed concentration maps with confidence intervals. Hotspot maps

10.2 Data management pipeline

The Data Management Pipeline includes five stages that manage data from collection to analysis. First, 1-Hz sensor data and accompanying metadata are **published** to remote (cloud) systems. Next, the sensor data and metadata are **ingested** into Aclima cloud storage. This Level 0 data is archived to ensure it is never altered. PML data is processed separately but in compatible formats. The raw, Level 0 data is **transformed** into calibrated physical quantities (Level 1) and further refined standard measurements (Level 2a), applying necessary corrections, time-shifting adjustments for sensor lag, and performing both automated and manual data quality flagging. Next, the **models** are used to aggregate L1/L2a information into higher-level geospatial data products (Level 3 using standard statistical methods and Level 4 employing advanced modeling techniques) to identify emission sources and disproportionately affected areas. Lastly, the data in all levels are labeled and **stored** using scalable cloud data storage. The original collected data is always preserved and snapshots are taken at critical states. CARB will have access for a three month period post-contract.

10.3 Data review and quality assurance

The data management system incorporates support for data review checks, defined as the manual or automated flagging of automated signals from sensor time series. Scientific details of data review can be found in the Appendices C, D, E, and F. Different data review and QA activities take place at different stages.

During the active deployment of a monitoring device and as data is streaming to the cloud, the monitoring team periodically checks (through a combination of manual and automated processes) the data being ingested to flag any sensor or data quality issues as they arise. Wherever possible, issues are resolved quickly in the field. Data that must be omitted from use for any reason (e.g. leaks, sensor failure, flow blockage, etc) is flagged.

After the deployment of a monitoring device is over (once the device returns to its home base), the monitoring team conducts a full review of all sensor data collected during that device's deployment, to ensure any issues that may have slipped through the cracks during the deployment period are detected before data is finally verified. Once again, any well-characterized data issues are flagged and any omissions from use are marked.

Once the deployment of all monitoring devices in the fleet is over (once all devices return to home base and the monitoring period is over), all collected data is re-processed to take account of flags and omissions and to prepare data for handing over to CARB and the community.

The original data coming from the sensors is always preserved, as well as all annotations from the various review and QA steps, so that the inclusion or omission of specific data can be properly traced.

10.4 Data transfer

Finalized L2a data will be transferred to CARB via secure cloud storage, following a defined schema compatible with EPA's AQS where applicable. File formatting and delivery cadence are specified in Appendix F.

10.5 Data visualization

Data will be used to create datasets and visualizations (e.g., Esri StoryMaps) focused on identifying pollution sources and areas of disproportionate impact, with templates and specific data layers described. Aclima will develop these but CARB will own and host the final StoryMaps.

11. Work plan for conducting field measurements

The plan must describe field procedures that will be followed by those conducting measurements and provide the timeline for community air monitoring. Field procedures spell out individual tasks with enough detail so that air district staff or community members with the necessary training can complete the tasks. Examples of specific field procedures include documenting actions in logbooks, completing chain of custody forms, and conducting specific quality control procedures. The timeline needs to establish the duration of field measurements and denote milestones for completing key tasks. The plan will also describe communication and coordination steps to ensure field personnel know whom to contact for questions and how work products are delivered. Relevant safety considerations should also be documented.

The work plan for field measurements is distinguished by the monitoring approach.

11.1 Broad area monitoring

11.1.1 Field materials and procedures

Broad area monitoring principally involves the Aclima fleet (Aclima Mobile Platforms, or AMPs). Each vehicle is operated by an Aclima employee, who begins their shift at a local hub powering up instruments, a safety check, and troubleshooting. Their driving day is managed by a mobile application in their vehicle and includes mandated breaks. The day ends back at the facility and a shutdown routine.

During the day, each AMP is active on a route, constantly collecting data at 1 second intervals

11.1.2 Communication and coordination

The operations team uses a range of software applications for communication, fleet management, safety, and navigation:

- Information for each operator starting their shift is communicated via a messaging application.
- Each operator can access online resources (written and video instructions) that describe specific standard operating procedures and provide resources for a range of encountered situations.
- Any photos or notes that the operator takes during the day are captured via a dedicated fleet management application.
- A sensor/instrument interface gives basic information to the operator on data reporting status.
- A dashboard mapping application loads the monitoring plan for the day and provides guidance on the route the operator must follow
- For general communication, a dispatch phone line is maintained.
- Operators can also file tickets for issues that cannot be immediately resolved.
- Safety training and issues are handled via a dedicated platform.

11.1.3 Timeline: duration, frequency, milestones, and deadlines

Broad area monitoring will be conducted by Aclima mobile platforms (AMPs) from June 2025 through the end of February 2026, for a total of approximately nine months of monitoring.

11.2 Targeted area monitoring

In addition to the Broad Area Monitoring, the following section details the work plan for Targeted area monitoring that will be conducted in San Jose.

11.2.1 Field materials and procedures

The Berkeley van, always operated by a Berkeley affiliate alongside a co-pilot/navigator, starts at either the UC Berkeley campus or, when necessary, a predetermined external location close to the intended sampling area(s). Driving days begin with safety checks, instrument and server inspection, troubleshooting where necessary, and calibrations when appropriate. A target area and time are predetermined before each day's drive. The day ends back at the starting location, and post-drive safety, troubleshooting, and data checks are followed, as well as calibration procedures when appropriate.

The van records data at 1 second intervals, both when actively deployed and when it is at rest. In rare cases, the van may be used for limited stationary monitoring in certain locations and situations, and data from the stationary periods will be reported. Otherwise, monitoring data from drive days is automatically prepared for reporting, and stationary data is available upon request.

11.2.2 Field communication and coordination

Before and after operation, coordination and communication of monitoring activities are performed primarily via in-person meetings between the van's team (operators and co-pilots) and key project personnel. Throughout operation, management, safety, and navigation needs are addressed through a variety of procedures:

- Each team member has access to online, cloud-based resources that include specific standard operating procedures and resources for resolving a range of common situations.
- Navigation is handled primarily by the co-pilot directing the operator based on continuous feedback from the data systems. Instrument data is plotted on a map in real-time, allowing for simultaneous hotspot identification and tracking of previously driven roads.
- During each drive, the co-pilot takes notes which are automatically saved to a cloud drive.
- A dashcam is set up in the van which saves photos locally. The SD card is backed up to a cloud drive manually after every drive.
- A web-based interface gives real-time information to the van operators on instrument status and measured pollutant concentrations.
- When the van is operating, an on-call senior scientist is always available in Berkeley for safety, coordination, troubleshooting, and other assistance. On-call team members have near real-time access to the web-based interface to remotely monitor progress and aid in troubleshooting.
- Prior to conducting monitoring, the Berkeley PML team will meet with project representatives from Acterra in order to gain a proper understanding of the local context around the air quality concerns specified in the CAMP for targeted area monitoring. Communication channels may also be established during this meeting in order to provide real-time updates from community members about current air quality conditions or expected events that may impact air quality during the monitoring period.

11.2.3 Timeline: duration, frequency, milestones, and deadlines

Targeted area monitoring will be conducted in San Jose for a duration of approximately 1 week over a time period to be determined between June 2025 - February 2026.

How will data be used to take action?

12. Evaluating effectiveness

The monitoring work plan and data will be evaluated across all stages of the monitoring phase of SMMI to ensure that air monitoring objectives are being met. These evaluations include on-going processes during monitoring,data review while collection is ongoing, and at data verification at the end of the monitoring period after all data has been collected. For additional details on these processes, see our detailed QA documentation in Appendices C, D, E, F, and G.

12.1 Evaluating effectiveness during the monitoring period:

Effectiveness will be continuously evaluated during the active data collection phase to ensure the monitoring is progressing as planned and that potential issues are identified and addressed promptly. This ongoing evaluation will involve several key components:

- **Manual Data Review:** Aclima staff will conduct weekly assessments of vehicle and sensor performance, as well as overall data quality. These reviews consist of visual review of time series data from all sensors on each deployed vehicle, responding to automated alerts for specific known patterns of device issues (e.g. sample line leaks) and addressing through corrective actions as needed, and a review of other associated diagnostic data. The Berkeley PML team conducts manual data review using an approach outlined in Appendix G.
- **Automated Data Quality Checks:** The data processing pipeline includes automatic status indicator flags that signal when measurements fall outside predefined environmental or physical specifications for the sensors. These flags serve as immediate alerts for potential sensor malfunctions, data anomalies (e.g., negative values or concentrations outside the sensor's range), or issues with supporting systems like flow rates. These checks occur as data streams through the data processing pipeline, in near real-time. T
- **Contextual Data Review:** Where available, data from regulatory monitoring sites within the mapping area will be used to provide context for large-scale air quality trends over time. This allows for a comparison of Aclima's sensor data with established networks, helping to identify whether observed patterns are consistent with broader trends or potentially indicative of issues with Aclima's measurements. Factors such as distance between mobile and stationary measurements, road type, site type, and temporal aggregation will be considered during these comparisons. These evaluations occur on a weekly basis as part of the manual review process.

- **Measurement Quality Objectives:** Acceptable quantitative criteria for data quality indicators at the individual sensors (e.g., precision and bias) will serve as benchmarks for evaluating effectiveness. These are referred to as calibration acceptance criteria in our detailed Quality Assurance document (Appendix C) In addition to calibration prior to the start of monitoring, all AMNs will receive calibration checks (and subsequent recalibrations) on a 6-8 week basis over the 9 month monitoring period, including at the end of monitoring. The Berkeley PML team will evaluate their QA checks according to acceptance criteria detailed in Appendix G
- **Data Verification:** A thorough data verification process will be conducted on an ongoing basis throughout the monitoring period in order to produce finalized data in monthly increments with a 3 month lag time. The data verification process consists of 1) a manual data review process, 2) a review of calibration results, 3) the application (where necessary) of adjusted calibration parameters and data quality flags for data reprocessing, and 4) a final review of the reprocessed data with applied calibration adjustments and data quality flags. During this process, all of the above data quality checks described above are re-evaluated just prior to and immediately after any reprocessing of data occurs. This is the final stage before data is finalized and will occur in monthly increments no more than 3 months after the data is collected. The Berkeley PML team conducts a similar data verification process as Aclima and on the same delivery cadence; specifics are outlined in Appendix G.
- **Evaluating Broad Area Monitoring Completeness:** Aclima mobile monitoring campaigns are designed to repeatedly drive roads in a monitoring area such that the roads are visited 20 times on average. An automated drive planning system evaluates the amount of driving coverage throughout a region on a daily basis and directs drivers to prioritize visiting roads in relatively underdriven regions. Additionally, Aclima analysts continuously monitor temporal and spatial driving coverage in the event that manual drive routing is needed to prevent regions with unexpectedly low numbers of visits. This is tracked by measuring the average number of measurements on each road by census block group.
- **Evaluating Targeted Area Monitoring Completeness:** The PML team will evaluate the completeness and representativeness in a way that is appropriate and responsive to the targeted area study conducted. In San Jose, the approach is a general survey of areas in the vicinity of community concerns and known sources. The number of repeat passes will be analysed along with pass-to-pass variability by scientists in charge of the data collection to evaluate the completeness of monitoring.

12.2 Evaluating effectiveness at the end of the Monitoring Period:

A comprehensive evaluation of the overall effectiveness of the community air monitoring initiative will be conducted at the conclusion of the data collection and verification phases. This final evaluation will be documented in the SMMI final report and will provide an overall assessment of the uncertainty associated with the collected data and derived data products. This will encompass various sources of error, including intra-network variability (uncertainty between different monitoring platforms), inter-network comparability (comparison with other monitoring networks, such as regulatory sites), sensor specific measurement errors, and modeling and sampling errors.

- **Comparison with External Data:** The report will include comparisons between Aclima's measurements and data from regulatory stationary monitoring sites. These comparisons will evaluate the accuracy and precision of Aclima's mobile measurements against established reference methods over various timescales. Metrics such as Mean Bias Error (MBE), Mean Absolute Error (MAE), and R^2 will be used to quantify the agreement between the datasets. Additionally, comparisons of the modeled ambient concentration estimates with annual averages from nearby regulatory monitors will be included to assess the overall performance of the data products

- **Aclima and PML Calibration Results**: Results from the calibration events conducted on Aclima's Mobile Nodes (AMNs) and the PML team, both before, during, and after their deployment. These results will help characterize the typical measurement error at the device level by comparing sensor readings to reference instruments and amongst themselves.
- **Stationary Comparison with Regulatory data**: This evaluation will compare data from Aclima's stationary AMNs, collocated at regulatory monitoring sites, with the measurements from those regulatory monitors. This comparison will help determine the measurement error and how Aclima's data aligns with the established regulatory network's data.
- **Mobile Comparison with Regulatory data**: This analysis will involve comparing in situ measurements collected by Aclima's mobile monitoring fleet near regulatory sites with the concurrent data from those stationary sites. This will provide insight into the agreement between mobile and stationary measurements, considering both measurement errors and the natural spatial and temporal variability of pollutants. This is only relevant for Aclima’s data, not the PML data.
- **Ambient Concentration Comparison with Regulatory data**: The hyperlocal ambient concentration estimates will be compared with long term average concentrations from regulatory stationary monitors. This will help assess the overall uncertainty in Aclima's estimates, including factors like modeling and the temporal sparseness of mobile measurements. This is only relevant for Aclima’s data, not the PML data.
- **Analysis of completeness and representativeness:** Analysis will be performed to show how well distributed data collection is across times of day, days of week, and season. Additionally, the number of passes in each location will be reported. Similar analyses will be conducted in similar ways for both the targeted and broad area monitoring approaches.

12.3 End of monitoring

Monitoring ends when deployments for all vehicles (AMPs and PMLs) are complete. To determine of the appropriate time to end monitoring in support of this CAMP (within the contractual and resource constraints of the SMMI project), the monitoring team will evaluate whether:

- Monitoring coverage has exceeded the required minimum percentage coverage requirement for priority communities within the SMMI-wide monitoring areas(i.e. Across all CNCs, not just San Jose)
- Data gathered is sufficiently representative of the seasonal, time of day, and day of week variation across the monitored area (i.e. not biased by data collection at one specific time), such that they can support the objectives, sub-objectives and presentation plans as uniquely defined in this monitoring plan
- Data gathered is sufficiently representative of the spatial variation in air quality across the monitored area, such that they can support the objectives, sub-objectives and presentation plans as uniquely defined in this monitoring plan

The results of all quantitative evaluations of effectiveness listed above will be included in a Quality Assurance report to accompany the final project report. Details on the above activities will be included for both Aclima and the PML teams.

13. Data analysis and interpretation

13.1 Preparation of finalized datasets

As described in Section 10 on data management (and in detail in the Data Management documentation in Appendix F), 1-second "finalized" data collected by all sensors and instruments will go through several data verification and validation protocols, and transformation steps before they are described as finalized and made available to CARB.

"Finalized" data is defined as sensor signals transformed to geophysical quantities of measurement (Level 2a), calculated using the sensor signal plus associated physical measurements directly related to the measurement principle such as temperature and relative humidity measurements. Data flagged for artifacts will also be included.

13.2 Aclima analysis, interpretation, and visualization of data

Mobile monitoring data gathered under this CAMP are intended to facilitate focused actions by communities and CARB, including any future work to identify and prioritize locations for more comprehensive community-scale air monitoring, or develop Community Emissions Reduction Programs (CERPs).

To support this potential future work, the monitoring team will generate a series of additional datasets that can help communities better understand and interpret the data in the context of the concerns detailed in this CAMP. These datasets will be in addition to the finalized 1-second finalized data provided directly to CARB and require further processing as described in Section 10 in this monitoring plan. These datasets can support identifying and characterizing sources or identifying disproportionate spatial and temporal impacts within a community.

The following is a brief description of the different possible analysis and visualization approaches used by SMMI. In some cases, the analysis approaches are matched with specific monitoring approaches, but there can be various combinations of monitoring and analysis approaches that could be selected to appropriately achieve the desired monitoring objectives.

- **Clusters of enhancement detections on a map** - Identifying locations of pollutant enhancements (high concentrations above background levels) on a map. Clustering or grouping of pollutant enhancements refers to identifying locations where multiple enhancements of the same pollutants are detected at multiple different times over the course of monitoring.
- **Statistics on enhancement detections** - Statistical values that describe how often enhancements were detected in a specific location. Examples include number of detections, the number of detections per visit, or the number of distinct days of detections.
- **Chemical speciation bar graph or pie chart** - A bar chart or pie graph that indicates the relative concentration of different key pollutants of interest in a specific location. This can represent the pollutants within an enhancement detection, averaged across an enhancement cluster (i.e. multiple enhancements in the same location), or in ambient concentrations of background air.
- **Diurnal plot of enhancement detection events** - This analysis shows the frequency of enhancement detections in a particular location by hour of day. This analysis requires balanced sampling across different times of day in the same location.
- **Ambient concentration gradients over plume transects** - Displaying ambient concentrations as they vary in space in the downwind region of an air pollution plume. This type of analysis is generally paired with the plume transect monitoring approach, but a general survey approach may also be appropriate in certain situations.

- **Ambient concentration map of key pollutants -** Displaying a map of ambient concentrations that are generally representative over the time period that monitoring takes place. Typically the general survey monitoring method or broad area monitoring is required for this type of analysis.
- **Area-wide chemical breakdown bar graph or pie chart -** A bar graph or pie chart showing the relative proportion of different pollutant concentrations detected on overage over a particular area of covered. Typically the general survey monitoring method is most useful for this type of analysis

Some example forms of final data visualizations are shown below. These example visualizations can help address the community specific concerns in San Jose for the concerns assigned monitoring objectives in Table 6. The map of ambient concentration estimates shown in Figure 13 is directly responsive to the monitoring objective of identifying disproportionate impacts (e.g. major roadways and high traffic around concert and sports arenas). The heat map of TVOC hotspots (Figure 14) is responsive to the monitoring objectives of characterizing sources (e.g. the targeted area study around industrial sources, or other PM or VOC sources identified in Table 6). Note that broad area monitoring may result in visualizations that provide information (for example clusters of enhancements) about additional concerns not specifically assigned monitoring objectives or unknown sources not listed specifically as community concerns here.

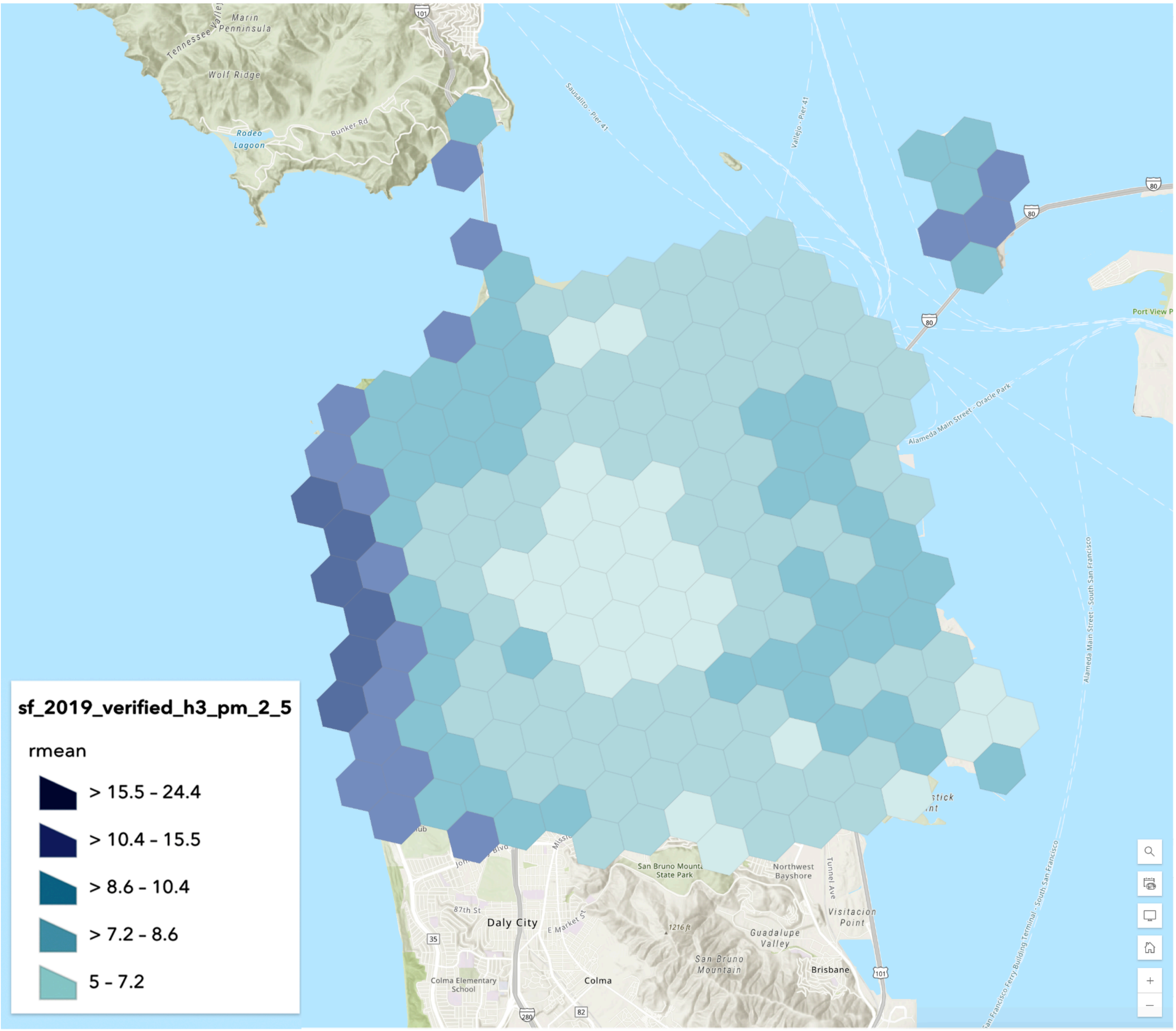


Figure 13: Example of a map of ambient concentration of $PM_{2.5}$ over a specific area plotted using hexbins. In this type of map, the color indicates pollutant concentration. In this example, colors indicate PM2.5 concentrations for data collected over a 1 year time period in San Francisco, CA. Map data © Mapbox, © OpenStreetMap.

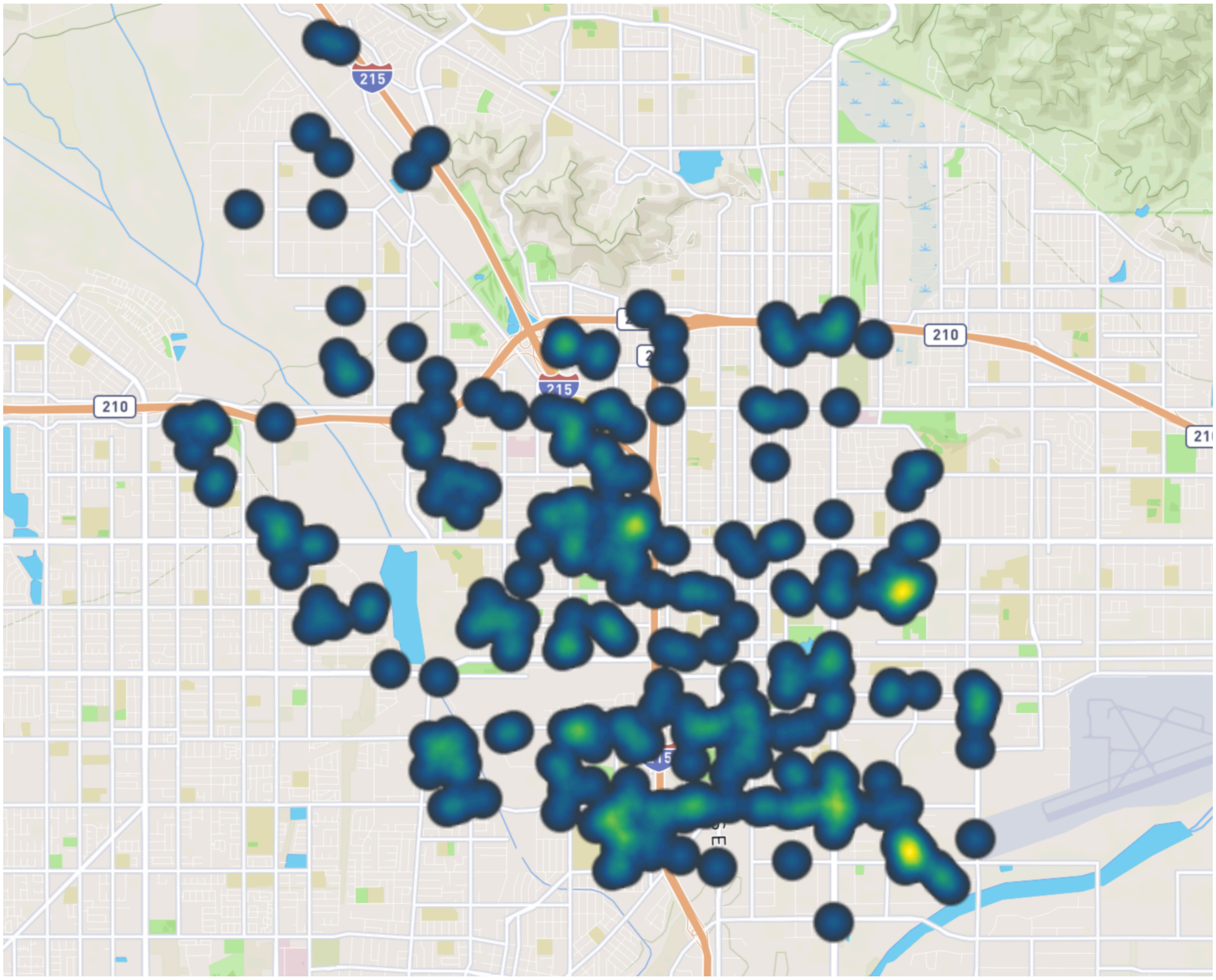


Figure 14: Example of plotting an enhancement-based dataset (TVOCs) as a heatmap. In this type of map, the density of individual enhancement events are shown, where the brighter colors indicate a higher density of detected enhancements. In this example, data collected over a 3 month period in San Bernardino, CA are shown, Map data © Mapbox, © OpenStreetMap.

For the concerns assigned specific monitoring objectives in this monitoring plan, the analysis approaches are specified in Table 6, in Section 4.3. Appendices D and E provide more detailed descriptions of how different analyses are performed and the different implementations of the approaches that are possible. The specific implementation of these approaches will be determined after the data is collected and evaluated. Data from both Aclima platforms and the Berkeley PML will be analysed according to the general approaches outlined above.

14. Communication of results to support action

The mobile monitoring data collected in this community will be analyzed and presented to support focused action to reduce emissions or exposure. This requires an accessible visualization, of which Aclima has many. CARB has selected ESRI StoryMaps as their visualization platform.

The project offers Engagement Leads supplemental budgets for capacity building and relationship building to foster the partnerships necessary for translating data into emissions reduction actions.

14.1 Reporting of high concentrations prior to the end of the contract

The intent of the SMMI is not for real-time alerting. However, during data collection, there may be instances where pollutant concentrations significantly exceed expected levels. To address these situations, a response protocol has been established to ensure that such anomalies are promptly reviewed, assessed, and, where necessary, mitigated in coordination with relevant agencies and community stakeholders. If concentrations exceed thresholds defined below and that alert is deemed viable after analysis and assessment by Aclima or a Partner Mobile Lab, Aclima will inform the local Air Districts or other relevant local authorities. Not every alert will trigger a report. Only after in depth investigation by scientists in the field or remotely via data analysis will an alert event be deemed viable for reporting.

Pollutants that will be included and the assessment protocol and reporting structure are detailed in the table below.

Table 11: Pollutants that will be included and the assessment protocol and reporting structure

Pollutant	Initial Assessment Protocol	Data Reporting and Communication to Local Air Districts or Other Relevant Local Authorities by Aclima	Community Updates
Methane/Ethane Relevant threshold: 100 ppm methane[a]	Aclima: ● Alert Detection ○ Detection above threshold TBD ● Data Analysis ○ Validation of Measurements ○ Trend and Historical Data Assessment ○ Environmental Context Evaluation ○ Schedule repeat visits if necessary	Aclima: ● If Alert is Deemed Viable – Prepare and Submit Report: ○ Location/Time of Event ○ Historical detections in the area ○ Classification of methane source (thermogenic or biogenic) ○ Description of the local environment (land use, sources, notable features) ○ Placeholder for Summary of CARB's Findings and Next Steps	CARB: ● Monthly Summary Reports will be posted to the CARB website and will include: ○ A summary of reports generated ○ Locations and timestamps of detections ○ Results of preliminary analysis ○ Actions taken or recommended follow-up steps Aclima: ● A comprehensive summary will be included

		• Email the completed report to designated CARB contacts within 2-3 business days of verification	in the End-of-Campaign Report, covering: ○ All events detected over the course of the campaign ○ Historical patterns and trends ○ Overall progress and response efforts
Toxic Air Contaminants Relevant species and thresholds[b]: ethylene oxide (5 ppm CAL/OSHA PEL-STEL), formaldehyde (2 ppm CAL/OSHA PEL-STEL), benzene (5 ppm CAL/OSHA PEL-STEL 5ppm), toluene (CAL/OSHA PEL-STEL), acrolein (0.3 ppm NIOSH STEL), and carbon monoxide (200 ppm CAL/OSHA PEL-STEL)	PMLs: Alert detection • Detection above threshold (will refer to short term permissible exposure limit (PEL) or Recommended Exposure Limit (REL) as appropriate) Data Analysis • Validation of Measurements • Repeated measurements • Environmental context evaluation	PMLs: If Alert is Deemed Viable Event after analysis and repeated monitoring: • Air district will be notified by Aclima immediately upon verification of the event • PMLs will prepare and submit Report within 3 days of verification: ○ Location/Time of Event ○ Pollutant and concentration ○ Historical detections in the area ○ Description of the local environment (land use, sources, notable features) Note: Reporting timelines may vary based on the instrumentation used, QA/QC protocols, and time required to validate findings.	CARB: • Monthly Summary Reports will be posted to the CARB website and will include: ○ A summary of reports generated ○ Locations and timestamps of detections ○ Results of preliminary analysis ○ Actions taken Aclima: • A comprehensive summary will be included in the End-of-Campaign Report, covering: ○ All events detected over the course of the campaign ○ Historical patterns and trends ○ Overall progress and response efforts

a) Threshold for methane is not based on a specific health-based action limit, but is based on historical data collected by Aclima, indicating values typically associated with large significant natural gas leaks.

b) Air toxics contaminants are those that may be measured PMLs and monitored in real time by scientists aboard the mobile platform. The thresholds are based on health action limits, however, it should be noted that these are limits only used as a benchmark to trigger follow up investigation and do not indicate that these health action limits have actually been exceeded. The event will only be reported if the scientists deem the alert to be a viable event based on their investigation. Additionally, the species detected by this method will be uncalibrated signals that may have high uncertainties (up to 50% in some cases)

14.2 Public Data Access

Upon completion of the contract, CARB will make the finalized monitoring data available for public access through the CARB AQview website. Data for each region and pollutant will be provided in standardized, comma-separated values (CSV) format to ensure broad compatibility with commonly used data analysis tools and software. This approach supports transparency, encourages independent analysis, and facilitates community and academic engagement with the air monitoring results.

14.3 Community Story Maps

Aclima will deploy the finalized raw data and appropriately-selected data analyses (described in Sections 13.2 and 13.3) in accessible online, public, interactive and free-to-use visualizations built on the Esri platform. These visualizations will be in the format of a customized platform built with Esri StoryMaps and hosted by CARB. A range of analyses are available to identify potential sources and to identify locations of disproportionate impact, drawing on data collected through both targeted area monitoring conducted by Berkeley and broad area monitoring conducted by Aclima.

14.4 Final Report

A final report will be delivered to CARB at the end of the contract, May 19, 2026. This report will provide a comprehensive analysis of the data collected by Aclima and the Partner Mobile Laboratories during the SMMI and will include the following sections:

Executive Summary: The report will include an executive summary to highlight the key takeaways, recommendations, or limitations of the report.

Summary and Timeline of Air Monitoring: The report will provide a summary of the air monitoring activities conducted and a timeline of when these activities took place. This will offer context and background on the project.

Discussion of Data Collection, Validation, and Analysis: The report will detail how the air quality data were collected using Aclima's mobile monitoring platforms and partner mobile laboratories. It will also explain the quality assurance and quality control (QA/QC) procedures implemented to ensure the data's integrity, including how the data were validated. Furthermore, the report will describe the methods used to analyze the collected data, potentially including analyses for identifying pollution sources and areas of disproportionate impact like diesel indications, toxic air contaminant hotspots, and natural gas leaks.

Summary of Significant Findings and Conclusions: The report will present a summary of the key findings from the air monitoring campaign. This will include ambient concentrations and any identified pollution enhancements. These findings will be presented in a manner understandable to a non-scientific audience.

Recommendations and Next Steps: Based on the findings, the report will offer recommendations for potential next steps. This may include suggestions for tracking progress or verifying results achieved by community emissions reduction programs, or for future, more comprehensive monitoring efforts.

Dissemination Plan: The report will outline how the data and the findings will be disseminated and discussed with appropriate decision-makers so that the information can lead to the intended actions for emissions reduction and public health improvement. This will include the use of publicly accessible data visualizations such as ESRI Storymaps. The report will also mention the virtual public meeting organized to explain project results and discuss possible next steps.

Public Meeting: To better help community members understand the content of the final report in an accessible manner, Aclima and California Air Resources Board staff will organize online meetings by air district (or sub-group within air district if necessary) to explain project results, answer questions, have community members share their experiences engaging with the project, and discuss possible next steps. Acterra will play a major role in outreach and promoting community attendance at this meeting. This meeting will be conducted in English with Spanish interpretation and designated Spanish breakout rooms. To ensure further accessibility to results, Aclima will provide one-page result summaries for each community in both English and Spanish that Engagement Leads can distribute physically or via Whatsapp or text.

Input from Stakeholders: The final technical report will incorporate input from stakeholders across the initiative, including the Project Expert Group, community representatives, air quality officers, and environmental justice leaders.

Accessibility: Aclima will consider accessibility needs for the print document, such as alt text and color design.

The report will be provided to CARB in both PDF and the original electronic format.

Appendices

Full appendices are available here: https://aclima.earth/smmi-camp-appendices

- Appendix A: SMMI Community Engagement Plan (CEP)
- Appendix B: SMMI Community Mileage Allocation
- Appendix C: Aclima Quality Assurance System
- Appendix D: Aclima Hyperlocal Ambient Concentration Estimate Validation and Quality Assurance System
- Appendix E: Aclima Hyperlocal Enhancement-based Data Products Quality Assurance System
- Appendix F: Aclima Data Management Plan
- Appendix G: Partner Mobile Laboratory Quality Assurance Project Plan (QAPPs) and Data Management Plans
- Appendix H: Approach for Assigning Targeted Area Studies
- Appendix I: Complete Table of Pollutants and Instrumentation
- Appendix J: Public Comment and Response Documentation
- Appendix K: Community Meeting Evaluations