# Exhibit C1 - Scope of Work

## 3. Scope of Work

| Objective | Activities | Output (s) | Outcome (s) |
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| Analyze air quality issues by assessing environmental data collected in the targeted area. | Install three Aeroqual AQM65 air quality monitoring stations at selected locations of the City College Campus.<br><br>Establish a student researchers and data analysts team to perform hourly and weekly data analysis and associated reporting. | Collect and analyze data from air monitors. Compare data from general air analysis and Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) levels.<br><br>Compare data with geospatial data sets from the Environmental Protection Agency (EPA)<br><br>Study the possible correlation between more common | Establish and enhance understanding of local air quality and air quality concerns in communities identified as AB 617 communities.<br><br>Create, distribute, and promote educational materials and resources to support community |

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| | Once launched, it offers complete access to all live data collected to the San Diego Air Pollution Control District (APCD) and CARB's AQ View. | pollutants such as CO2, PM 2.5, diesel, and BTEX concentration. | knowledge and understanding. |
| Support the awareness of air quality issues and related workforce development for members of AB 617 communities. | Offer AB 617 students the opportunity to participate in air quality research.<br><br>Create paid internships positions for students from AB 617 communities.<br><br>Train students to analyze data with geospatial tools and incorporate text, interactive maps, videos, and multimedia into ArcGIS Story Maps with a professional skilled in Geographic Information Systems (GIS). | Create educational materials such as posters and presentations.<br><br>Reach out to local media outlets for partnership in preparing public service announcements (PSAs) and other community service-oriented programming.<br><br>Create a project website to support the posting of interactive web maps and Story Maps.<br><br>Support student access to and training in Geographic Information Systems (GIS) for collecting, mapping, and analyzing geospatial and environmental data. | Strengthen the and ability of AB 617 communities to understand scientific knowledge and training in data analysis and air quality. |
| Increase San Diego's community awareness of health risks | Report findings and project outcomes to APCD and other local organizations and leaders | Educate 1000+ community members and local leadership regarding air quality, environmental | Inform the community about health challenges and develop a community-wide |

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| related to BTEX and other pollutants. | associated with the project using Esri Story Map with geospatial analysis and maps of data.<br><br>Report project findings and outcomes to the APCD and other local organizations and stakeholders associated with the project by sending written reports every semester.<br><br>Produce poster boards and presentations to be incorporated into SACNAS monthly events within AB 617 communities. | hazards, and health issues. | response and resolution to air quality concerns. |
| Minimize exposure of San Diego City College and San Diego High School community members to air pollution. | Communicate with campus leaders through regular written reports and Esri story maps.<br><br>Create maps showing pollution level averages by location and time of day.<br><br>Incorporate data and maps into online multimedia presentations ArcGIS Story Maps | Propose and communicate strategies to minimize the community's exposure to toxic components.<br><br>Offer space for students from AB 617 communities to debate and deliberate air quality issues and possible solutions, both in their school/ workspace and homes/neighborhoods. | |

**Performance Evaluation:**

*Project Goals*

- Further monitor, research, and understand air quality issues in the San Diego area and their effect on the community's environment and public health.
- Provide workforce development and academic opportunity to students from AB 617 communities.
- Educate community members to better understand air quality issues in their community and the resulting environmental and health hazards.

*Expected Results*

- Community members will better understand local air quality and community health, and environmental challenges and solutions.
- Project input is provided to and utilized by APCD community action plans and local organizations and academia interested in air quality and environmental justice.
- Develop action plans and initiatives to minimize community members' exposure to harmful pollutants.

The objectives of our evaluation are to:

1. Actively monitor the air quality around the San Diego City College area and assess impacts to the local community, especially those who live or work in the area or attend San Diego High School and San Diego City College.
2. Research information about the concentration of BTEX compounds in the air over time and space and the correlation with other pollutants and traffic counts and congestion to contribute to efforts to improve air quality.
3. Provide education and skills development to members of AB 617 communities.

All data collected and analyzed will be made publicly available by sharing online multimedia ArcGIS Story Maps, reports of project developments, and other resources. The project team will share information with local community organizations, scientific and higher education institutions, and health organizations. Project team members will create posters, presentations, and other materials and distribute them to SACNAS and other stakeholder organizations for use at community outreach and educational events.

Information shared with the community will include the times and locations where the air pollution is at its peak, strategies to avoid activity in high-impact areas, and plans to reduce general air pollution in the area.

*Anticipated Challenges and Opportunities.*

The community engagement component of the project may face some difficulties in the first year due to activity restrictions related to the COVID-19 pandemic. Given uncertainties with possible restrictions, it is hard to assure that the expected engagement opportunities will happen as projected. However, the monitors can be installed and will be collecting data with no delays anticipated.

# Monitor Placement

Grantee: San Diego City College Foundation
Grant Number: G20-CAGP-36

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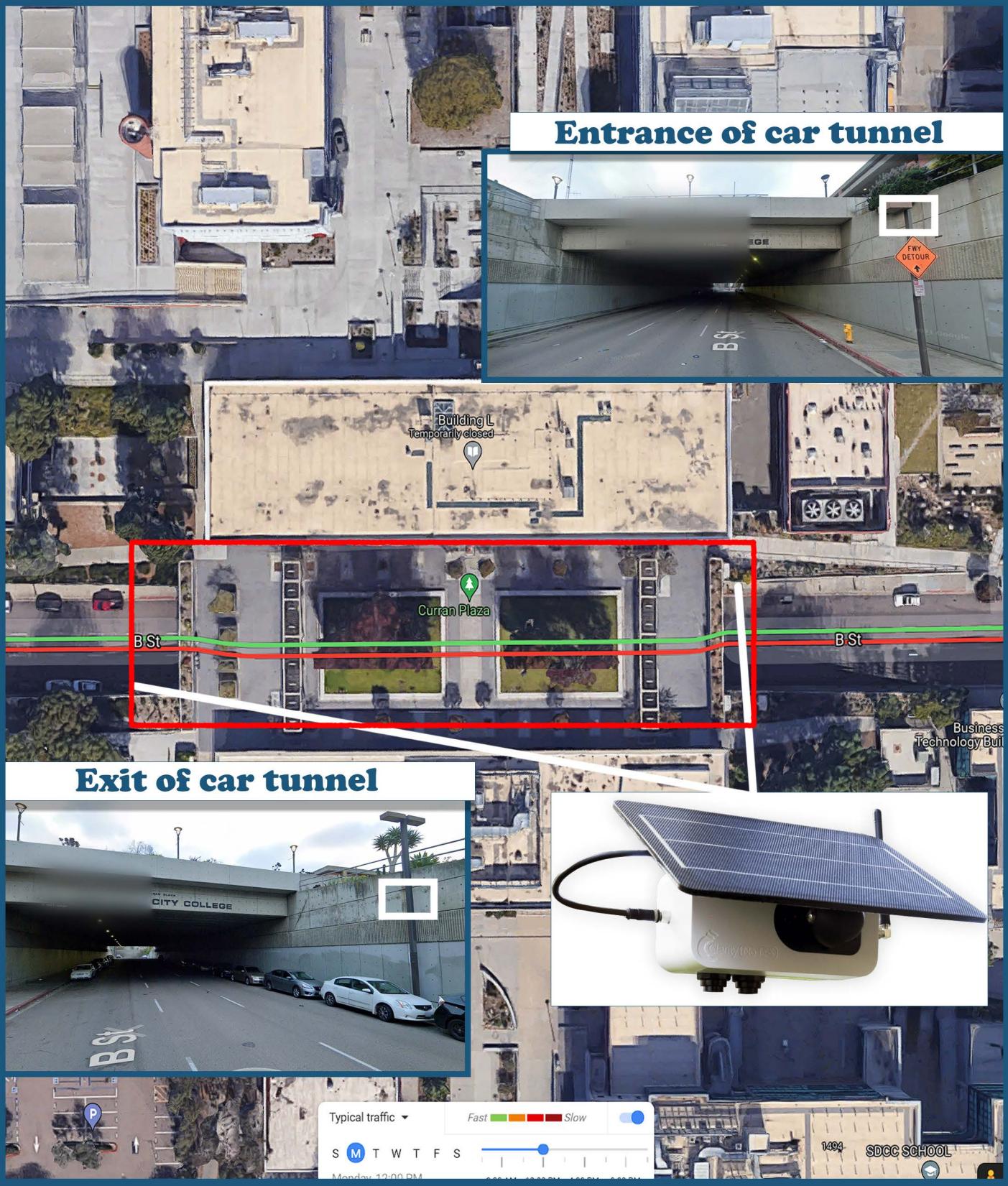
# Clarity Monitor Placement



**Monitoring Station's Features**

We chose to work with Aeroqual AQM 65 BTEX monitoring stations because, among the few market options of monitors that can real-time track BTEX, this air monitor can also detect other significant pollutants. This model includes modules that are capable of measuring ozone (O3), nitrogen dioxide (NO2), nitrogen oxides (NOx), carbon monoxide (CO), sulfur dioxide (SO2), hydrogen sulfide (H2S), carbon dioxide (CO2), particulate matter less than 2.5 µm (PM2.5), particulate matter less than 1 µm (PM1), total suspended particles (TSP), meteorological data, and noise pollution.

It is crucial to track all these pollutants to deepen the understanding of the local air quality and risks and study the correlation between BTEX concentration and other more commonly identified pollutants, especially particular matter (PM2.5) and nitrogen dioxide (NO2).

We will also be working with Clarity Node-S solar-powered model due to its ability to track PM 2.5 and NO2 while being a small form factor. This monitor also has a large battery capacity capable of tracking pollutants for fifteen days without solar harvest.

Both Aeroqual and Clarity provide air quality visualization through a dedicated dashboard, device-to-cloud communication, and dedicated support. Ideally, we want to identify correlation patterns through data analysis to enable researchers and community air monitoring programs to leverage data from this study.

**Monitors' Placement**

Three Aeroqual BTEX AQM 65 monitors will be placed on the roofs of buildings P ("Athletics, Exercise Science, and Health"), R ("Learning Resource Center / Library"), and S (Science). In addition, two Clarity Node-S monitors will be placed at the end of each road tunnel on B Street in downtown San Diego. Each building corresponds to a unique activity. Coverage on all three buildings will provide insights to community members on different pollutants impacting their daily activities.

The first air monitor will be placed on the "Health, Exercise Science, and Athletics" building, which includes a fitness center and is adjacent to several sports fields. It is next to two major highways: Interstate 5 (~1000 ft) and California State Route 163 (302 ft). It is also adjacent to an urban farm on campus. Giorgini et al. (2016) found increased health risks during aerobic activity near sources of outdoor air pollution such as motor vehicle traffic. Therefore, by monitoring local pollution, we can better determine risks for outdoor activities.

The second Aeroqual air monitor will be placed on top of the "Learning Resource Center" (LRC) building. This building is known for foot traffic and is adjacent to a parking lot, a car tunnel, and a sustainable agriculture farm. The closest street to the LRC is B Street, and Google Maps data considers typical traffic in this location to be slow-moving with a high volume of idling vehicles. The closest highways are Interstate 5 (~1500 ft) and the California State Route 163 (1372 ft). Although the highways are at a greater distance than the other monitors, Choi et al. 2012 discovered that freeway pollution can travel farther at night up to 4,920 ft due to high winds, and daytime pollution traveled 650 ft. With this air monitor placement on the

LRC, we will understand how location changes pollutant exposure compared to the rest of the monitors.

In addition to Aeroqual monitor placement, we will be placing two Clarity Node-S on the entrance and exit of the B Street traffic tunnel due to the limited accessibility inside the tunnel. Clarity monitors will be used due to their portability and reliability. A study conducted in China concerning the inside and outside of a road tunnel using an air quality monitoring van (Zhou et al. 2014) observed concentrations of CO, NO, NO2, and NOX for two days. And, it was discovered that the highest concentrations inside the tunnel were found in the morning rush hours, and lower at night, which was related to traffic conditions. In addition, wind conditions did not have a significant impact, and "concentrations of pollutants (CO, NO, NO2 and NOX) inside the tunnel were higher than those outside the tunnel, about 7, 109, 2 and 18 times, respectively". Even though this was a short study, our long-term analysis will allow more profound insight into trends of PM2.5 and NO2 using clarity monitors.

The last Aeroqual monitor will be placed on the roof of the Science ("S") building. Native plant gardens and diverse wildlife surround this building, and it includes a rooftop greenhouse. Situated in another foot traffic-heavy area, the "S" building is 400 feet from Interstate 5, a major highway. A research study described how air pollutants such as ozone (O3), sulfur dioxide (SO2), and nitrogen oxide (NOx) negatively affected the metabolic process and structure of plants (Weber, Tingey, & Andersen, 2002). O3 oxidizes the cells that form the tissue and damage the leaf openings. Meanwhile, NOx reacts with SO2 and water to produce acid rain.

In addition, research conducted on air pollution regulation found co-benefits to humans and birds. Study co-author Amanda Rodewald states that "not only can ozone cause direct physical damage to birds, but it also can compromise plant health and reduce numbers of the insects that birds consume" (Leonard, 2020, n.p.). Sources of ground-level ozone can be attributed to emissions from vehicle exhaust that react with Volatile Organic Compounds (VOC) and NOx in the presence of heat and sunlight (U.S. Environmental Protection Agency, 2021). Harmful impacts of these pollutants range from ruptured blood vessels to lung failure. Birds are also exposed to more particulate matter (PM) due to their higher breathing rate, and particle sizes less than 2.5 microns get stuck in branches of the lungs (Qin, 2015).

It is also worth mentioning that the San Diego City College Child Development Center is 233 ft from I-5. According to the U.S. EPA report titled *Near Roadway Air Pollution and Health: Frequently Asked Questions*, "Air pollutants from cars, trucks and other motor vehicles are found in higher concentrations near major roads.

People who live, work, or attend school near major roads appear to have an increased incidence and severity of health problems associated with air pollution exposures related to roadway traffic, including higher rates of asthma onset and aggravation, cardiovascular disease, impaired lung development in children, preterm and low-birthweight infants, childhood leukemia, and premature death" (U.S. Environmental Agency, 2014, p. 2).