Pechanga Band of Indians
Environmental Department

Annual Ambient Air Monitoring Network Plan 2025

July 1, 2025

Pechanga Band of Indians | Environmental Department
P.O. Box 1477 | Temecula | California | 92593

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Introduction

The Pechanga Band of Indians ("Tribe") is committed to protecting air quality for the well-being of its community and environment. As part of this commitment, the Tribe operates an Ambient Air Monitoring Program ("Program") to track key pollutants and ensure compliance with federal air quality standards.

Under 40 CFR 58.10, the U.S. Environmental Protection Agency (EPA) requires an Annual Ambient Air Monitoring Network Plan ("Plan") to document the establishment, maintenance, and effectiveness of air quality surveillance systems. This report provides a comprehensive overview of the Pechanga monitoring network, details site operations, pollutant measurements, data availability, and planned modifications for the upcoming year.

The Pechanga Environmental Department (PED) oversees the Program, ensuring data integrity through strict quality assurance and control protocols. Since its launch in 2008, the Program has provided valuable insights into air quality trends, supported regulatory decision-making, and reinforced Pechanga's sovereignty in environmental management. The Tribe operates the Program through PED. The PED staff perform a complete review of the Program annually to ensure operations are running effectively and within compliance for valid data submission.

The Program began in 2008 with the collection of air quality data according to the program Quality Assurance Project Plan (QAPP) which follows the EPA's National Ambient Air Quality Standards (NAAQS). The data collected and monitored at the Pechanga Air Station ("Station") includes ozone (O_3) and particulate matter 2.5 microns and smaller ($PM_{2.5}$). The monitors used for data collection are federal equivalent method/federal reference method (FEM/FRM); data is submitted to the EPA online Air Quality System (AQS) quarterly.

Public Comment

The Plan must be made available for public review and comment for 30 days prior to submission to U.S. EPA. The Plan is available on Pechanga's public website[1] and a notice is posted on the Tribal Members' website notifying the public of the document's availability for review and comment. The community and public are able to access the report and submit written comments on the Plan. The state and local agencies are also able to access the plan for review and comment. Any comments received by the PED are reviewed, documented, and added to Plan, as applicable. Comments will be included in Appendix A.

Network Design

The Tribe has been operating the Station since 2008. The site is located on the Pechanga Indian Reservation ("Reservation") on the southeastern boundary of the city of Temecula (Figure 1). The Station collects data for multiple pollutants. Table 1 provides a list of monitoring locations, pollutants monitored, and the EPA AQS site code. On April 3, 2015, the EPA took final action to revise the boundaries of the Southern California air quality planning areas to designate the Reservation as a separate air quality planning area for the 1997 8-hour ozone NAAQS.

[1] www.pechanga-nsn.gov

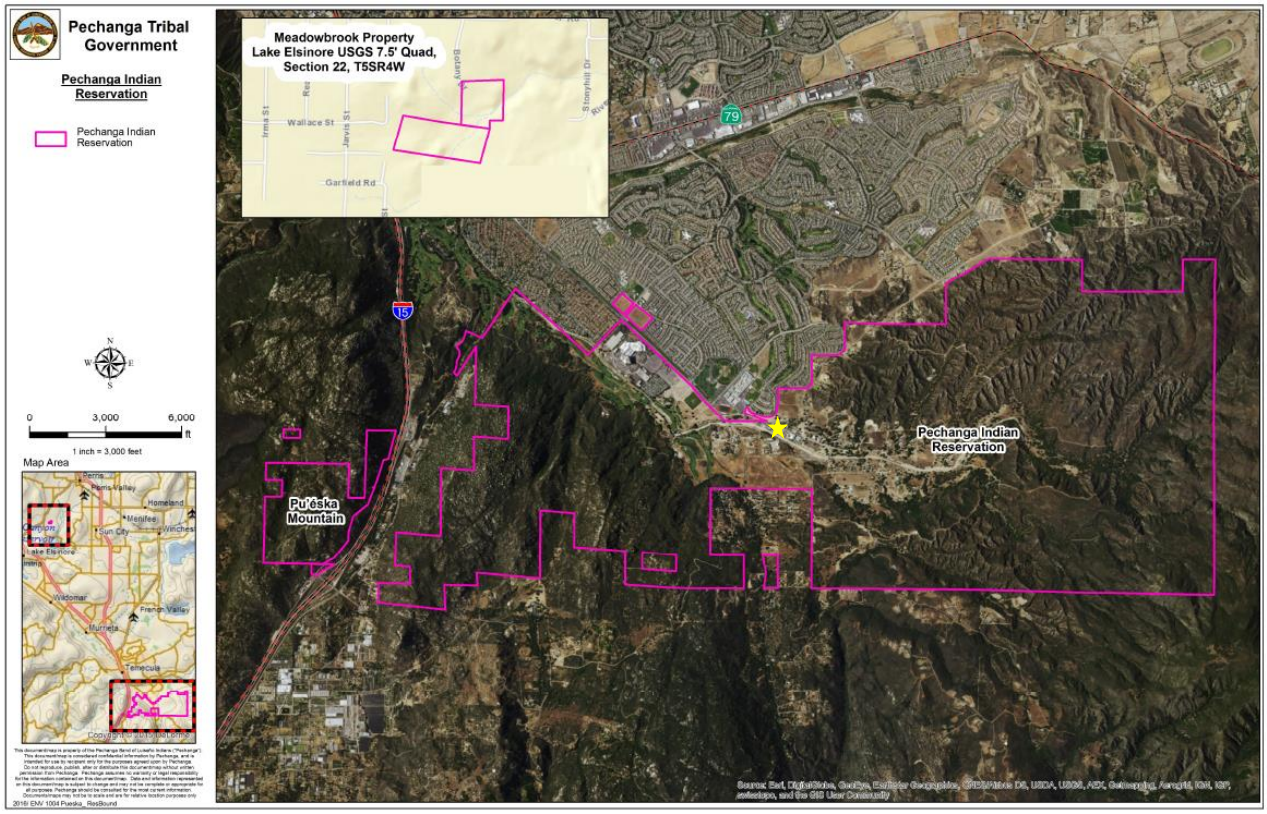

Figure 1: Pechanga Air Station Location - Air Quality Planning Area for the 2015 8-hour ozone NAAQS

Table 1: Pechanga Air Station Pollutants Monitored

Site Name	AQS Code	Pollutants Monitored
Pechanga Air Station	TT-586-0009	O_3 $PM_{2.5}$

Site Selection and Purpose

The selection of the air monitoring site was based on the factors listed below:

- Representative concentrations and exposure in areas of population density;
- Highest concentrations of pollutants in an area based on topography and/or wind patterns;
- Compliance with and/or progress made towards meeting the NAAQS;
- Pollution trends;
- General background concentration levels (the exact location of a site is most often dependent on the logistics of the area chosen for monitoring, such as site access, security, and power availability); and,
- Welfare-related impacts in more rural and remote areas such as visibility impairment and effects on vegetation.

The Pechanga Air Monitoring Station was selected based on its ability to provide representative air quality data for the Reservation. Its location at the Pechanga Government Center ensures accessibility, security, and continuous operation, meeting EPA siting criteria for regulatory monitoring. The site effectively captures regional air pollution trends, including O_3 and $PM_{2.5}$, which are influenced by both local emissions and regional transport.

Given the site's established reliability, compliance with 40 CFR Part 58, Appendix D, and the consistency of historical data, no additional regulatory monitoring sites were deemed necessary. While a second, non-regulatory informational site is planned for additional $PM_{2.5}$ data collection in the fall of 2025, the current station remains the primary and most suitable location for ensuring NAAQS compliance and supporting tribal air quality management objectives.

NAAQS Comparable

The Plan and Periodic Network Assessment requirements can be found in 40 CFR Part 58.10. According to provision, the Station meets the suitability requirement for the program. There are no proposed changes or modifications to the Program. The O_3 and $PM_{2.5}$ data can be compared to the NAAQS.

Minimum Monitoring Requirements

The Station meets the minimum monitoring requirements for criteria pollutants O_3 and $PM_{2.5}$ (Tables 2, 3, and 4). The data is certified annually. The last report, which includes the Airborne Particulate Monitor (APM) 600 for 2023 data, was submitted in May 2025.

O_3

Ground-level O_3, or photochemical smog, is not emitted into the atmosphere as O_3, but rather is formed by the reactions of other pollutants. The primary pollutants entering into this reaction, including volatile organic compounds (VOCs) and oxides of nitrogen (NO_x), create O_3 in the presence of sunlight (ultraviolet radiation).

O_3 exposure has been associated with increased susceptibility to respiratory infections, medication use, doctor and emergency department visits and hospital admissions for individuals with lung disease. O_3 exposure also increases the risk of premature death from heart and lung disease. Children are at increased risk from O_3 because their lungs are still developing and they are more likely to have increased exposure since they are often active outdoors[2].

In addition, cumulative O_3 exposure can lead to reduced tree growth; visibly injured leaves and increased susceptibility to disease, damage from insects and harsh weather. These effects can have adverse impacts on ecosystems, including loss of species and changes to habitat quality, and water and nutrient cycles[3].

Table 2: Minimum Monitoring Requirements for O_3

Tribal Land	County	County Population in July 1, 2023 (US Census Bureau)	Annual Design Value 2021-2023 (ppb) O_3 8-hour 2015	Monitors Required	Active Monitors	Monitors Needed
Pechanga Indian Reservation	Riverside CA Metro Area / San Diego-Chula Vista-Carlsbad, CA Metro Area	2,492,442 / 3,269,973	73	1	1	0

The Pechanga air station is collecting O_3 data, measured in parts per billion (ppb), to be used by the Tribe to make regulatory decisions in support of Tribal sovereignty. The data are also collected for use by the community and for the Tribe to monitor NAAQS compliance. The data are submitted to AQS to demonstrate compliance with NAAQS and to support research by the community and regulatory agencies.

The equipment used in the station include a Teledyne API T400 O_3 analyzer that collects measurements of ambient concentrations of O_3 on a continuous basis. The T400 operates on the principle that O_3 molecules absorb UV light at a wavelength of 254 nanometers. The sample is drawn into the analyzer through the sample bulkhead and is split into two gas streams. The two

[2] U.S. EPA. 2024. Health Effects of Ozone Pollution https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution#:~:text=Ozone%20is%20a%20powerful%20oxidant,ozone%20can%20cause%20health%20effects

[3] U.S. EPA. 2023. Ground-level Ozone Ecosystem Effects. https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics#:~:text=Elevated%20exposures%20to%20ozone%20can,vegetation%20during%20the%20growing%20season

samples are then analyzed and averaged. This analyzer was designated by the EPA as an equivalent method for the monitoring of O_3 (EQOA-0992-087) in June 2017[4].

The station has been using the DR DAS LTD datalogger since October 2016. The datalogger began collecting data on November 14, 2016. This software provides the O_3 data in 1-minute, 5-minute, hourly, 8-hourly, and daily averages. The statistics that are calculated and presented in the O_3 data reports include: 1) maximum 1-hour average for the month; and, 2) maximum running 8-hour average for each day. Both are calculated per the method described in 40 CFR 50 Appendix I.

$PM_{2.5}$

Fine particulate matter with a diameter of 2.5 microns or less is created primarily from industrial processes and fuel combustion. These particles are breathed deeply into the lungs. Exposure to particle pollution is linked to a variety of significant health problems ranging from aggravated asthma to premature death in people with heart and lung disease[5].

Table 3: Minimum Monitoring Requirements for $PM_{2.5}$

Tribal Land	County	County Population in July 1, 2023 (US Census Bureau)	Annual Design Value 2021-2023 ($\mu g/m^3$)	24-Hr Design Value $\mu g/m^3$	Monitors Required	Active Monitors	Monitors Needed
Pechanga Indian Reservation	Riverside CA Metro Area / San Diego-Chula Vista-Carlsbad, CA Metro Area	2,492,442 / 3,269,973	6.1	13	2	2	0

The Pechanga air station is collecting $PM_{2.5}$ data, measured in micrograms per cubic meter ($\mu g/m^3$), to be used by the Tribe to make regulatory decisions consistent with its Tribal sovereignty. The data are also collected for use by the community and for the Tribe to monitor NAAQS compliance. The data are submitted to AQS to demonstrate compliance with NAAQS and to support research by the community and regulatory agencies. This site is suitable for comparison against the annual and 24-hour $PM_{2.5}$ NAAQS.

The method used for the Beta Attenuation Monitor (BAM) Model 1020 configured for $PM_{2.5}$ FEM monitoring includes sampling of ambient air through a standard EPA PM_{10} inlet head and a Very Sharp-Cut Cyclone (VSCC) at a volumetric flow rate of 16.7 liters per minute. A Smart Heater attached to the inlet system, and controlled by relative humidity (RH) measured at the filter tape, minimizes positive artifact from water sorption in humid environments. Particles in the air stream

[4] List of Designated Reference and Equivalent Methods, Issue Date: June 16, 2017. https://www3.epa.gov/ttnamti1/files/ambient/criteria/AMTIC_List_June_2017_update_6-19-2017.pdf
[5] AirNow. 2023. Particle Pollution (PM). https://document.airnow.gov/air-quality-guide-for-particle-pollution.pdf

are collected and measured on quartz fiber filter tape. $PM_{2.5}$ concentrations and sampling attribute data are reported hourly for a 24-hour period, from midnight to midnight. The equipment is listed in the December 2016 EPA list of designated reference and equivalent methods as: EQPM-0798-122[6]. The program is interested in replacing the current analyzer with a BAM 1022, however it is not passing quality control (QC). The future replacement has not been determined and the station operator is still running tests on the analyzer.

A collocated $PM_{2.5}$ sampler at the air station is a Thermo Scientific Partisol Model 2000i. The Partisol 2000i Air Sampler was designed to conform to the EPA FRM for fine particulate sampling. The hardware was designed to meet or exceed the requirements of CFR 40 Part 50. It is located 2.34 meters from the primary sampler, at a right angle to the prevailing southwest wind direction. The Partisol 2000i sampler operates by splitting a PM_{10} sample stream into its $PM_{2.5}$ and coarse fractions (particles between 2.5 and 10 microns in size) using an EPA designed virtual impactor for the 2.5 micron cutpoint. The system collects particulate matter on two 47 mm diameter filters simultaneously. The sampler is operated for a 24-hour period, from midnight to midnight, once every 6 days, according to the national schedule[7]. The equipment is listed in the EPA list of designated reference and equivalent methods as: RFPS-0694-098[8].

Meteorological Instruments

The purposes of the meteorological measurements at the Pechanga air station are to provide local information to the Tribe and to assist in providing characterizations of regional-scale meteorological patterns in conjunction with the air quality measurements.

The station uses the Vaisala WXT520 equipment to collect meteorological data, with the exception of solar radiation, to inform data validation. The equipment uses specific data collection and analysis methods. They are as follows:

For wind speed and wind direction: The WXT520 uses Vaisala WINDCAP® sensor technology in wind measurement. The wind sensor has an array of three equally spaced ultrasonic transducers on a horizontal plane. Wind speed and wind directions are determined by measuring the time it takes the ultrasound to travel from each transducer to the other two. The wind sensor measures the transit time (in both directions) along the three paths established by the array of transducers. This transit time depends on the wind speed along the ultrasonic path. For zero wind speed, both the forward and reverse transit times are the same. With wind along the sound path, the up-wind direction transit time increases and the down-wind transit time decreases. The wind speed is calculated from the measured transit times using the formula $V_W = 0.5 \times L \times (1/ t_f - 1/t_r)$. A signal processing technique is used so that wind speed and wind direction are calculated from the two array paths of best quality.

[6] List of Designated Reference and Equivalent Methods, Issue Date: December 17, 2016. https://www3.epa.gov/ttnamti1/files/ambient/criteria/AMTIC%20List%20Dec%202016-2.pdf
[7] U.S. EPA. 2024. EPA Sampling Schedule. https://www.epa.gov/system/files/documents/2023-09/2024_sampling_schedule.pdf
[8] List of Designated Reference and Equivalent Methods, Issue Date: December 17, 2016. https://www3.epa.gov/ttnamti1/files/ambient/criteria/AMTIC%20List%20Dec%202016-2.pdf

For precipitation: The WXT520 uses Vaisala RAINCAP® Sensor 2-technology in precipitation measurement. The precipitation sensor comprises of a steel cover and a piezoelectrical sensor mounted on the bottom surface of the cover. The precipitation sensor detects the impact of individual raindrops. The signals from the impact are proportional to the volume of the drops. Hence, the signal of each drop can be converted directly to accumulated rainfall. Advanced noise filtering technique is used to filter out signals originating from other sources than raindrops.

For pressure, temperature, and humidity: The WXT520 contains separate sensors for pressure, temperature, and humidity measurement. The measurement principle of the pressure, temperature, and humidity sensors is based on an advanced RC oscillator and two reference capacitors against which the capacitance of the sensors is continuously measured. The microprocessor of the transmitter performs compensation for the temperature dependency of the pressure and humidity sensors. This includes a capacitive silicon BAROCAP® sensor for pressure measurement, a capacitive ceramic THERMOCAP® sensor for air temperature measurement, and a capacitive thin film polymer HUMICAP®180 sensor for humidity measurement.

Data Availability

Data is submitted to EPA through the AQS and the data can be accessed through the USEPA system. The types of data submitted to AQS include:

- Hourly values for the continuous monitors,
- 2000i FRM data from Pace Laboratories,
- Precision checks and 1-point QC checks,
- Flow Rates from the $PM_{2.5}$ monitors,
- Performance Evaluation results
- Semi-Annual Flow Rates

The department annually reviews the data and submits a letter and data certification to EPA for the Annual Data Certification requirement. The 2023 air monitoring data certification was submitted to EPA in May 2025. Currently, the PED makes the ambient air quality data available to Pechanga Tribal Members upon request. The members can send an email the department or show up in person to request a copy of the specified data.

Monitoring Objectives.

The ambient air monitoring networks must be designed to meet three basic monitoring objectives. These basic objectives are listed below. The appearance of any one objective in the order of this list is not based upon prioritization. Each objective is important and must be considered individually:

(a) Provide air pollution data to the general public in a timely manner. The Program makes Station data available through AQS. The data are uploaded into the AQS quarterly.

(b) The Program will work to capture data to meet compliance with NAAQS standards and emissions strategy development. Data from monitors of various types can be used in the development of attainment and maintenance plans.

(c) The Program submits information to AQS which can be accessed for the purpose of support for air pollution research studies.

Detailed Site Information

Site Name: Pechanga

The Station was established in the spring of 2008 in order to represent regional-scale air quality. It is located at the Pechanga Government Center. On May 21, 2012, the EPA designated the Reservation as a separate air quality planning area for the 2008 ozone standard. On April 3, 2015, EPA designated the Reservation as a separate air quality planning area for the 1997 8-hour ozone National Ambient Air Quality Standard (NAAQS)[9]. On April 15, 2015 EPA designated the Reservation as a separate unclassifiable/attainment area for the 2012 primary annual $PM_{2.5}$ NAAQS[10].

Recent or Proposed Changes

The Program anticipates continuing the current operations. There is one regulatory monitoring station and one planned non-regulatory informational monitor. The program received Inflation Reduction Act (IRA) funding to install an informational ambient air program that will collect $PM_{2.5}$ through a Teledyne API Model T640 PM Mass Monitor. The site is located north of the primary site on the western side of the reservation on the Journey Golf Course. Data collection is planned to begin once the Department receives approval on the QAPP. The QAPP has been submitted to USEPA's QA branch for review. The data collected at the Journey Golf Course will be compared to the regulatory monitoring site located at the Pechanga Government Center. Once the informational station is operational, specific measurements and information will be included in Table 4. The PED continues to monitor and maintain the level of technical and professional proficiency as a designated separate air quality planning area for the 1997 8-hour ozone NAAQS, 2008 ozone standard, and 2012 primary annual $PM_{2.5}$ NAAQS. The Program purchased an updated Dr DAS datalogger to replace the current aging one in February 2025. The new datalogger is a X45G-Fanless Industrial Mini PC with Core i7 8565U, 16GB DDR4 RAM, 512GB SSD, Dual NIC LAN, 6*COM, 6*RS232, 6*USB, Windows 10 Pro, HD Wi-Fi, US power adapter, -20℃- 60℃.

Table 4: Pechanga Air Network Site Information

Site Name	Pechanga
AQS ID	TT-586-0009
GPS coordinates	33°26'52.37"N 117° 5'19.30"W
Location	Pechanga Government Center, Pechanga Reservation
Address	12705 Pechanga Road, Temecula, CA 92593
Counties	Riverside and San Diego
Distances to roads	Pechanga Road: 57 meters

[9] Approval of Tribal Implementation Plan and Designation of Air Quality Planning Area; Pechanga Band of Luiseño Mission Indians. https://www.govinfo.gov/content/pkg/FR-2015-04-03/pdf/2015-07534.pdf#page=1

[10] Air Quality Designations for the 2012 Primary Annual Fine Particle (PM2.5) National Ambient Air Quality Standards (NAAQS). https://www.federalregister.gov/documents/2015/01/15/2015-00021/air-quality-designations-for-the-2012-primary-annual-fine-particle-pm25-national-ambient-air-quality

	Pechanga Parkway: 1,075 meters Pala Road: 608 meters I-15: 4.6 kilometers		
Traffic counts	Pechanga Road: no data (road is within Reservation) Pechanga Parkway south of Pechanga Road: 11,090 vehicles. Pechanga Parkway north of Deer Hollow Way: 15160 (2021 data)[1] I-15: 97000 ADT (2021data)[2] [1](https://temeculaca.gov/DocumentCenter/View/209/Traffic-Count-Summary-PDF?bidId=) [2](https://dot.ca.gov/programs/traffic-operations/census)		
Groundcover	Paved from east to north; vegetated from south to west		
Representative Area	Pechanga Band of Indians Reservation- Riverside and San Diego County, Temecula, CA Tribal Land		
Pollutant, Parameter Occurrence Code (POC)	**Ozone** **1**	**$PM_{2.5}$** **1**	**$PM_{2.5}$** **2**
Primary / QA Collocated / Other	Primary	Primary	Collocated
Parameter Code	44201	88101	88101
Site Type	General/background & regional transport	General/background & regional transport	General/background & regional transport
Monitor Type	SLAMS	SLAMS	SLAMS
Monitoring Objectives	public information; NAAQS compliance; research	public information; NAAQS compliance; research	public information; NAAQS compliance; research
Network Affiliation	Pechanga	Pechanga	Pechanga
Method Code	087	170	143
FRM / FEM / ARM / Other	FEM	FEM	FRM
Collecting Agency	Pechanga Band	Pechanga Band	Pechanga Band
Analytical Lab	NA	N/A	Pace Labs 555 Absaraka Street Sheridan, WY 82801
Reporting Agency	Pechanga Band	Pechanga Band	Pechanga Band
Spatial scale	Regional	Regional	Regional
Monitoring Start Date	June 9, 2008	August 12, 2008	August 12, 2008
Current Sampling Frequency	Continuous	Continuous	1:6
Analysis method	N/A	N/A	N/A
Start date	June 9, 2008	August 12, 2008	August 12, 2008
Operation schedule	Continuous	Continuous	1 in 6 collocated
Sampling season	Year round	Year round	Year round
Probe height[†]	1.32 meters	2.55 meters	2.03 meters
Distance from supporting structure	1.32 meters	2.55 meters	2.03 meters
Distance from obstructions on roof	25.14 meters horizontal 3.8 meters vertical	26.84 meters horizontal 3.8 meters vertical	25.22 meters horizontal 3.8 meters vertical
Distance from obstructions not on roof	18.29 meters horizontal 1.50 meters vertical	29.57 meters horizontal 2.00 meters vertical	17.37 meters horizontal 1.00 meters vertical
Distance from tree	18.29 meters	18.90 meters	17.37 meters

dripline			
Distance to furnace or incinerator flue	N/A	N/A	N/A
Distance between collocated monitors	N/A	2.34 meters	2.34 meters
Unrestricted airflow	360°	360°	360°
Probe material	Teflon	N/A	N/A
Residence time for reactive gases NO/NO2/NOy, SO2, O3; PAMS: VOCs, Carbonyls (seconds)	5.78	N/A	N/A
Will there be changes within the next 18 months?	No	Unsure: BAM 1022 was purchased however it is not passing QC.	No
Is it suitable for comparison against the annual $PM_{2.5}$?	N/A	Yes	Yes
Frequency of flow rate verification for manual PM samplers audit	N/A	Monthly	Monthly
Frequency of flow rate verification for automated PM analyzers audit	N/A	Monthly	N/A
Frequency of one-point QC check (gaseous)	weekly	N/A	N/A
Last Annual Performance Evaluation (gaseous)	07/18/2024	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	12/11/2024 06/18/2024	12/11/2024 06/18/2024

Site Name	Pechanga			
Meteorological	**Wind Speed**	**Wind Direction**	**Ambient Temp**	**Rel. Humidity**
Manufacturer	Vaisala	Vaisala	Vaisala	Vaisala
Model	WXT520	WXT520	WXT520	WXT520
Range	0.0 to 60.0 m/s	000 to 360º	-10.0 to 50.0ºC	0-100% RH
Analysis method	Automatic Sensor and Formulation	Automatic Sensor and Formulation	RC Oscillator	RC Oscillator
Start date	April 27, 2015	April 27, 2015	April 27, 2015	April 27, 2015
Height above ground	11.7 meters	11 meters	9 meters	9 meters
Vertical distance from supporting structure	1.5 meters	3.3 meters	1.5 meters	1.5 meters

Horizontal distance from supporting structure	0.6 meters	0.6 meters	0.6 meters	0.6 meters
Distance from obstructions on roof	25.84 meters horizontal 3.8 meters vertical	25.84 meters horizontal 3.8 meters vertical	25.84 meters horizontal 3.8 meters vertical	25.84 meters horizontal 3.8 meters vertical
Distance from obstructions not on roof	72.85 meters	72.85 meters	72.85 meters	72.85 meters
Unrestricted airflow	360°	360°	360°	360°

Site Name	Pechanga		
Meteorological	**Precipitation**	**Pressure**	**Solar Radiation**
Manufacturer	Vaisala	Vaisala	Middleton
Model	WXT520	WXT520	SK01-D2
Range	N/A	450 to 600 mmHg	300-1150 nm
Analysis method	Piezoelectrical sensor and formulation	RC Oscillator and reference capacitors	Silocon photodiode detector
Start date	April 27, 2015	April 27, 2015	April 27, 2015
Height above ground	11.7 meters	11.7 meters	9.34 meters
Vertical distance from supporting structure	1.5 meters	1.5 meters	1.14 meters
Horizontal distance from supporting structure	0.6 meters	0.6 meters	N/A
Distance from obstructions on roof	25.84 meters horizontal 3.8 meters vertical	25.84 meters horizontal 3.8 meters vertical	26.44 meters horizontal 3.8 meters vertical
Distance from obstructions not on roof	72.85 meters	72.85 meters	18.00 meters
Unrestricted airflow	360°	360°	360°

Appendix A – Public Comment