Pechanga Band of Luiseño Indians
Environmental Department

July 1, 2018

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

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Introduction

The United States Environmental Protection Agency (EPA), through the Code of Federal Regulations (CFR) requires the Pechanga Band of Luiseño Indians (Tribe) to complete the Ambient Air Monitoring Annual Network Plan for the Tribe's ambient air monitoring station. EPA's requirements for the annual plan are listed in 40 CFR § 58.10.

The regulations from Title 40, Part 58, Section 10(a) of the Code of Federal Regulations (40 CFR 58.10, (a)(1)) state that:

> *"Beginning July 1, 2007, the state, or where applicable local, agency shall submit to the Regional Administrator an annual monitoring network plan which shall provide for the documentation of the establishment and maintenance of an air quality surveillance system that consists of a network of SLAMS monitoring stations that can include FRM, FEM, and ARM monitors that are part of SLAMS, NCore, CSN, PAMS, and SPM stations. The plan shall include a statement of whether the operation of each monitor meets the requirements of appendices A, B, C, D, and E of this part, where applicable. The Regional Administrator may require additional information in support of this statement. The annual monitoring network plan must be made available for public inspection and comment for at least 30 days prior to submission to the EPA and the submitted plan shall include and address, as appropriate, any received comments.."*

It is the Tribe's objective to maintain and operate its ambient air monitoring station according to all applicable federal regulations and guideline documents. The air station meets the requirements listed in CFR 58,10 (a)(1); except where otherwise noted, each monitor meets the requirements of appendices A, B, C, D, and E, where applicable. The purpose of this Ambient Air Monitoring Network Plan (Plan) is to provide evidence that current regulations are being met for the Pechanga air monitoring network, to detail any changes proposed for the 18 months following its publication, and to provide specific information on the existing monitoring site.

The Tribe operates the Air Monitoring Program through the Pechanga Environmental Department (PED). The PED staff performs a complete review of the Pechanga Air Program annually to ensure the program is running effectively and within compliance for valid data submission.

The Pechanga Air Program began in 2008 with the collection of air quality data according to the program Quality Assurance Project Plan (QAPP) which follows the US EPA National Ambient Air Quality Standards (NAAQS). The data collected and monitored at Pechanga Air Station includes ozone (O_3), Particulate Matter ($PM_{2.5}$), and oxides of nitrogen (NO_x), which are submitted annually to the EPA. There have no new or discontinued monitoring sites, new determinations that data are not of sufficient quality to be compared to the NAAQS have not occurred or changes in identification of monitors as suitable or not suitable for comparison against the annual $PM_{2.5}$ NAAQS

Public Comment

The annual monitoring network plan must be made available for public inspection for 30 days prior to submission to U.S. EPA. Information on how to comment on the plan and any comments received are listed in Appendix A.

The Annual Network Plan is available on the Pechanga website and a public notice is posted 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. The state and local agencies are also able to access the plan for review and comment, including input on any changes to a $PM_{2.5}$ monitoring network that impacts the location of a violating $PM_{2.5}$ monitor. Any comments received by the PED are reviewed, documented and added to Plan, as applicable.

Network Design

The Tribe has been operating its air monitoring 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 single air monitoring site collects data for multiple pollutants. Table 1 provides a list of monitoring locations, pollutants monitored and the EPA Air Quality System (AQS) site code. On April 3, 2015, the Environmental Protection Agency (EPA) took a final action to revise the boundaries of the Southern California air quality planning areas to designate the reservation of the Pechanga Band of Luiseño Indians of the Pechanga Reservation, California as a separate air quality planning area for the 1997 8-hour ozone National Ambient Air Quality Standard.

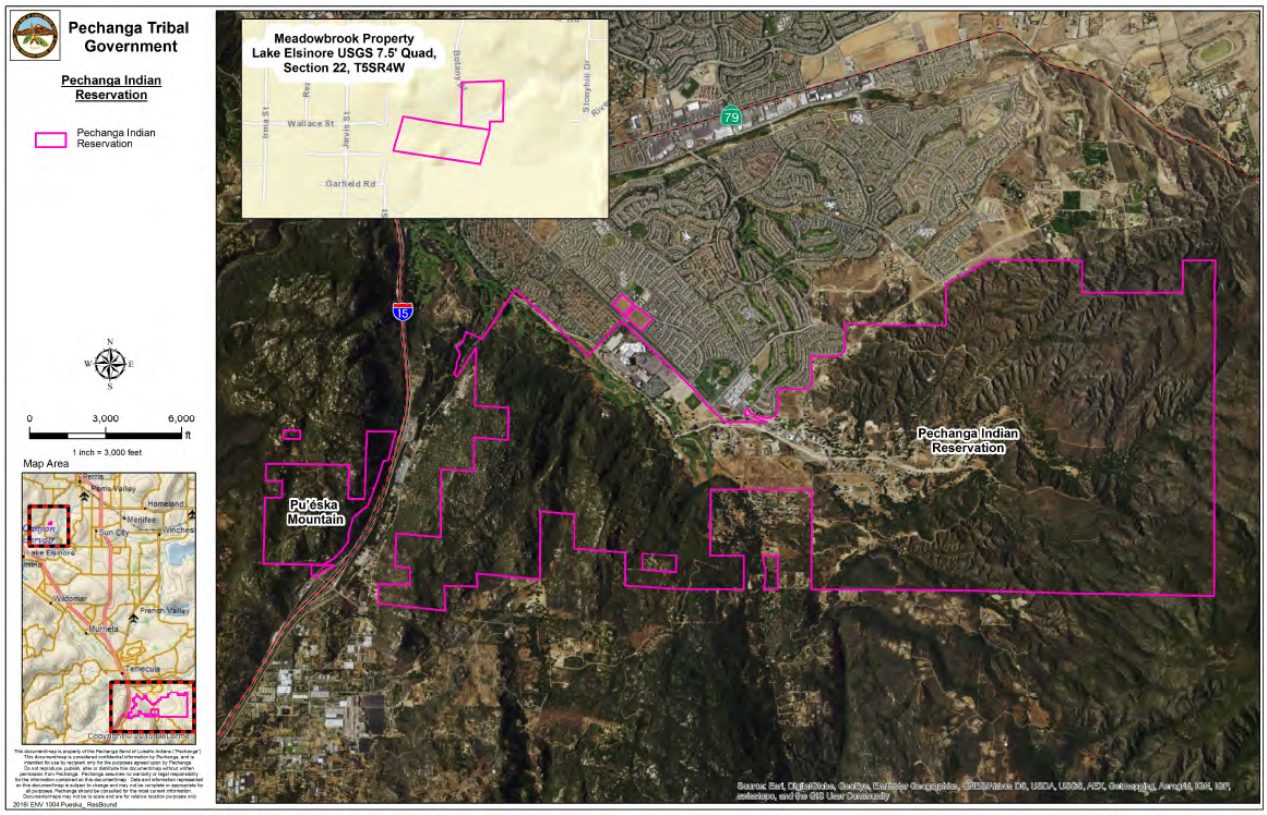

Figure 1 – Pechanga Air Station Location
Air Quality Planning Area for the 1997 8-hour ozone National Ambient Air Quality Standard

Site Name	AQS Code	Pollutants Monitored
Pechanga Air Station	TT-586-0009	NO_2 O_3 $PM_{2.5}$

Table 1 – Pechanga Air Station Pollutants Monitored

Site Selection and Purpose

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

- determine representative concentrations and exposure in areas of population density;
- determine the highest concentrations of pollutants in an area based on topography and/or wind patterns;
- judge compliance with and/or progress made towards meeting the NAAQS;
- track pollution trends;
- determine 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,
- determine the welfare-related impacts in more rural and remote areas such as visibility impairment and effects on vegetation.

NAAQS Comparable

40 CFR Part 58 Appendix B requires the identification of any sites that are suitable or not suitable for comparison against the 24-hour $PM_{2.5}$ NAAQS as described in Section §58.30. Pechanga air station meets this NAAQS requirement.

Minimum Monitoring Requirements

The Pechanga monitoring station meets the minimum monitoring requirements for all criteria pollutants O_3, $PM_{2.5}$, NO_2 (Tables 2, 3, and 4).

Ozone

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

Ozone 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. Ozone exposure also increases the risk of premature death from heart and lung disease. Children are at increased risk from ozone because their lungs are still developing and they are more likely to have increased exposure since they are often active outdoors[1].

In addition, cumulative ozone 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[2].

Table 2 Minimum Monitoring Requirements for O_3

Tribal Land	County	County Population in Year 2010	Annual Design Value 2015-2017 (ppm)	Monitors Required	Active Monitors	Monitors Needed
Pechanga Indian Reservation	Riverside/ San Diego	2,189,64/ 13,095,313	.069	1	1	0

The Pechanga air station is collecting ozone data 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 is a Thermo Scientific Model 49i ozone analyzer which is used to measure continuous ambient concentrations of ozone (O_3). The Model 49i operates on the principle that ozone (O3) molecules absorb UV light at a wavelength of 254 nm. The sample is drawn into the Model 49i through the sample bulkhead and is split into two gas streams. The two samples are then analyzed and averaged. This analyzer was designated by the EPA as an equivalent method for the monitoring of O_3, (EQOA-0880-047, August 27, 1980).

The station has been using the Dr. Das datalogger since October 2016. The datalogger began collecting data on November 14, 2016. This software provides the O_3 data in 1-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

[1] U.S. EPA. 2015. Ozone and Your Patients' Health Training for Health Care Providers. (http://www.epa.gov/apti/ozonehealth/population.html)
[2] U.S. EPA. 2015. Ground-level Ozone Ecosystem Effects. (http://www.epa.gov/groundlevelozone/ecosystem.html)

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[3].

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

Tribal Land	County	County Population in Year 2010	Annual Design Value 2015-2017 µg/m³	Daily Design Value µg/m³	Monitors Required	Active Monitors	Monitors Needed
Pechanga Indian Reservation	Riverside/ San Diego	2,189,64/ 13,095,313	10.2	20	0	2	0

The Pechanga air station is collecting $PM_{2.5}$ data 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. All sites are suitable for comparison against the annual $PM_{2.5}$ NAAQS.

The method used for the Beta Attenuation Monitor Model 1020 configured for $PM_{2.5}$ Federal Equivalent Method (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 16.7l 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 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.

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 U.S. EPA Federal Reference Method for fine particulate sampling. The hardware was designed to meet or exceed the requirements of CFR 40 Part 50. It is located 1.5 meters from the primary sampler, at a right angle to the prevailing southwest wind direction. Its sample inlet is nine meters above the ground, at the same height as the primary sampler. The Partisol 2000i sampler operates by splitting a PM_{10} sample stream into its fine ($PM_{2.5}$) and coarse fractions (particles between 2.5 and 10 microns in size) using an U.S. 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[4].

[3] AirNow. 2015. Particle Pollution (PM). (http://www.airnow.gov/index.cfm?action=aqibasics.particle)
[4] U.S. EPA. 2015. Nitrogen Dioxide Health. (http://www.epa.gov/airquality/nitrogenoxides/health.html)

NO_2

NO_2 is a highly toxic, reddish brown gas that is created primarily from fuel combustion in industrial sources and vehicles. It creates an odorous haze that causes eye and sinus irritation, blocks natural sunlight, and reduces visibility.

Table 4 Minimum Monitoring Requirements for NO_2

Tribal Land	County	County Population in Year 2010	Annual Design Value 2015-2017 (ppm)	Monitors Required	Active Monitors	Monitors Needed
Pechanga Indian Reservation	Riverside/ San Diego	2,189,64/ 13,095,313	22	0	1	0

The Pechanga air station is collecting NO_2 data 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 air program uses a Teledyne Model T200 Nitrogen Oxides Analyzer which uses chemiluminescence detection, coupled with state-of-the-art microprocessor technology to provide the sensitivity, stability and ease of use needed for ambient or dilution CEM monitoring requirements of nitric oxide (NO), nitrogen dioxide (NO_2) and the total nitrogen oxides (NOx) This analyzer was designated by the EPA as an reference method for the monitoring of NO_2, as method RFNA-1104-099.

The station uses a datalogger, DR. DAS, and associated software which provides the NO_x data in 1-minute, hourly, 8-hourly, and daily averages. The data are then processed and averaged for comparisons to federal ambient air quality standards. The statistics that are calculated and presented in the NOx data reports are: 1) maximum 1-hour average for each day; 2) maximum 1-hour average for the month; and 3) the annual mean.

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 for data validation. The equipment uses specific data collection and analysis methods. They are as follows:

For wind speed: 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.

For precipitation: WXT520 uses Vaisala RAINCAP® Sensor 2-technology in precipitation measurement. The precipitation sensor is comprised 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. The measured parameters are accumulated rainfall, rain current and peak intensity, and the duration of a rain event. Detection of each individual drop enables computing of rain amount and intensity with high resolution. Precipitation current intensity, which is internally updated every 10 seconds, represents the intensity during the one minute period before requesting/automatic precipitation message sending (for fast reacting to a rain event, during the first minute of the rain event the intensity is calculated over the period rain has lasted in 10-second steps instead of fixed one minute). Precipitation peak intensity represents the maximum of the calculated current intensity values since last precipitation intensity reset.

For pressure, temperature, and humidity measurement: WXT520 uses the measurement principle of the pressure, temperature, and humidity sensors. Measurement 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.

Data Availability

Data is submitted to EPA through the AQS and the data can be accessed through the system. The types of data submitted to AQS include the hourly values for the continuous monitors, the FRM data, the precision checks and 1-point QC checks. The department annually reviews the data and submits a letter and data certification to EPA for the Annual Data Certification requirement. Currently, the PED makes data available to Pechanga Tribal Members upon request.

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 a prioritized scheme. Each objective is important and must be considered individually:

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

(b) The Pechanga air 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 Pechanga Air 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 Pechanga ambient air monitoring station was established in the spring of 2008 in order to represent neighborhood-scale air quality. It is located at the Pechanga Government Center. On April 3, 2015 EPA designated the Pechanga Reservation as a separate air quality planning area for the 1997 8-hour ozone National Ambient Air Quality Standard (NAAQS).

Recent or Proposed Changes

The Pechanga Air Program anticipates continuing the current program that is in place. The program will continue to monitor and maintain the level of technical and professional proficiency as a newly designated separate air quality planning area for the 1997 8-hour ozone NAAQS.

There are no anticipated changes to the air station in the upcoming year. The Pechanga air program will continue to monitor and maintain the equipment and data; the program will be evaluated annually to comply with federal regulations and other regulations that may apply.

Photos of the Air Station Equipment

North 

Northeast 

East 

Southeast 

South 

Southwest 

West 

Northwest 

Table 6: 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: 57meters 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: 30,950ADT (2017 data) Pala Road: 12,600ADT (2016 data) I-15: 151, 000ADT (2016 data)*		
Groundcover		Paved from east to north; vegetated from south to west		
Representative Area		Pechanga Band of Luiseño Indians Reservation- Riverside and San Diego County, Temecula, CA Suburban/Rural.		
Pollutant, Parameter Occurrence Code (POC)	**Ozone** [1]	**$PM_{2.5}$** [1]	**$PM_{2.5}$ FRM** [2]	**NO_2** [1]
Primary / QA Collocated / Other	Primary	Primary	Collocated	Primary
Parameter Code	44201	88101	88101	42602
Site Type	General background	General background	General background	General background
Monitor Type	SLAMS	SLAMS	SLAMS	SLAMS
Network Affiliation	Pechanga	Pechanga	Pechanga	Pechanga
Method Code	047	170	143	090
FRM / FEM / ARM / Other	N/A	N/A	FRM	N/A
Collecting Agency	Pechanga Band	Pechanga Band	Pechanga Band	Pechanga Band

Analytical Lab	NA	N/A	RTI International (RTI) 3040 East Cornwallis Road P. O. Box 12194 Research Triangle Park, NC 27709	NA
Reporting Agency	US EPA	US EPA	US EPA	US EPA
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Monitoring Start Date	June 9, 2008	August 12, 2008	August 12, 2008	July 25, 2008
Current Sampling Frequency	Hourly	Hourly	1 in 6	Hourly
Sampling method	Photometric EQOA-0193-091	Beta Attenuation EQPM-0308-170	Beta Attenuation EQPM-0308-170	Chemiluminescent RFNA-1292-090
Analysis method	N/A	N/A	N/A	N/A
Start date	June 9, 2008	August 12, 2008	August 12, 2008	July 25, 2008
Operation schedule	Continuous	Continuous	1 in 6 coll	Continuous
Sampling season	Year round	Year round	Year round	Year round
Probe height†	1.26 meters	2.6 meters	2.03 meters	1.26 meters
Distance from supporting structure	1.3 meters	2.5 meters	2.4 meters	1.3 meters
Distance from obstructions on roof	16.15 meters horizontal 2.5 meters vertical	17.07 meters horizontal 2.5 meters vertical	15.24 meters horizontal 2.5 meters vertical	16.15 meters horizontal 2.5 meters vertical
Distance from obstructions not on roof	50.3 meters Horizontal 3 meters Vertical	50.3 meters Horizontal 3 meters Vertical	50.3 meters Horizontal 3 meters Vertical	50.3 meters Horizontal 3 meters Vertical
Distance from tree dripline	50.3 meters	50.3 meters	50.3 meters	50.3 meters
Distance to furnace or incinerator flue	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	1 meter	N/A
Unrestricted airflow	360°	360°	360°	360°
Probe material	Teflon	Teflon	N/A	Teflon
Residence time for reactive gases NO/NO2/NOy, SO2, O3; PAMS: VOCs, Carbonyls (seconds)	3.85	8.12	N/A	3.89
Will there be changes within the next 18 months?	No	No	No	No
Is it suitable for comparison against the annual $PM_{2.5}$?	N/A	Yes	No	N/A
Frequency of flow rate verification for manual PM samplers audit	N/A	N/A	Monthly	N/A
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	weekly
Last Annual Performance Evaluation (gaseous)	12/20/17	N/A	N/A	12/20/17
Last two semi-annual flow rate audits for PM monitors	N/A	2/1/17 6/9/17	2/1/17 6/9/17	N/A

† Height listed is distance from roof. Equipment is mounted on roof of Government Center building, 7.8 meters above ground level.

Site Name	Pechanga			
Meteorological	**Wind Speed**	**Wind Direction**	**Ambient Temp**	**Rel. Humidity**
Manufacturer	Vaisala	Vaisala	Vaisala	Vaisala
Model	WXT520	WXT520	WXT520	WXT520
Range	0.4 to 50.0 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 meters	11 meters	9 meters	9 meters
Vertical distance from supporting structure	3.3 meters	3.3 meters	1.5 meters	1.5 meters
Horizontal distance from supporting structure	N/A	N/A	N/A	N/A
Distance from obstructions on roof	16 meters	16 meters	16 meters	16 meters
Distance from obstructions not on roof	50 meters/ SW	50 meters/ SW	50 meters/ SW	50 meters/ SW
Unrestricted airflow	360°	360°	360°	360°

Site Name	Pechanga			
Meteorological	**Precipitation**	**Solar Radiation**	**Pressure**	
Manufacturer	Vaisala	Middleton	Vaisala	
Model	WXT520	SK01-D2	WXT520	
Range	N/A	0 to 1400 wt/m^2	600 to 800 mm Hg	
Analysis method	Automatic Sensor and Formulation	Differential thermopile	RC Oscillator	
Start date	April 27, 2015	April 27, 2015	April 27, 2015	
Height above ground	8 meters	8 meters	5 meters	
Vertical distance from supporting structure	3.3 meters	3.3 meters	1.5 meters	
Horizontal distance from supporting structure	N/A	N/A	N/A	
Distance from obstructions on roof	16 meters	16 meters	16 meters	
Distance from obstructions not on roof	16 meters	16 meters	16 meters	
Unrestricted airflow	360°	360°	360°	

*2017 Traffic counts are not available at time of report.

Appendix A – Public Comment