TETRA TECH

Disclaimer: This is a draft workplan for initial discussion purpose only. An updated version will be provided when additional and more detailed information becomes available.

COMPLIANCE MONITORING AND AMBIENT AIR MEASUREMENTS WORKPLAN (Rev. 1, May 7, 2019)

DEVIL'S GATE RESERVOIR RESTORATION PROJECT

1. INTRODUCTION

The 2009 Station Fire burned more than 160,000 acres of the San Gabriel Mountains, and the subsequent storms brought in more than 1.3 million cubic yards of sediment into Devil's Gate Reservoir, which greatly reduced the flood control capacity of the reservoir. Los Angeles County Public Works will restore the reservoir capacity by removing sediment to protect downstream communities along the Arroyo Seco. As part of the project, more than 70 acres of enhanced habitat will be created and restored, and invasive species removed (Attachment 1, Devil's Gate Reservoir Restoration project). The sediment removal component of the Devil's Gate Reservoir Project is expected to commence in May 2019.

To ensure the sediment removal project will meet regulatory requirements for fugitive dust emissions and to address the community's concerns regarding potential impacts to local ambient air quality from project operations, Tetra Tech on behalf of Los Angeles County Public Works, will conduct two types of air monitoring during the project period:

(1) Compliance air monitoring to ensure no air emissions from the project site exceeds the regulatory threshold at the project property perimeter; and,

(2) Ambient air monitoring to measure ambient levels of air pollutants of interest to evaluate air quality at selected receptor sites to assess potential impacts of the project operation.

Compliance monitoring and measuring ambient air quality is expected to be conducted prior to and during implementation of sediment removal at Devil's Gate Reservoir. In addition, the County will prepare an Inspection and Maintenance Program (IMP) to address emissions from haul trucks and construction equipment, which will be provided under separate cover.

2. PROPOSED AIR MONITORING PLAN

2.1 Objectives

The objectives of this air monitoring program are intended to:

- Measure target pollutant concentrations before the sediment removal project starts to characterize baseline air quality at the property fence line and ambient conditions
- The compliance monitoring will continue during the project period to collect data to ensure air emissions from project operation will not exceed regulatory thresholds
- The ambient air monitoring will continue during the project period to collect data to estimate potential impacts to local ambient air quality from project operations

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The collected data will be evaluated, and the results will be shared with the California Air Resource Board (CARB), the South Coast Air Quality Management District (AQMD), and local community groups.

2.2 Noise and Dust Control Measures

During project operations, a variety of administrative and engineering control measures will be implemented to address noise and dust including, but not limited to, the following:

- Hauling will be limited to Monday – Friday, 7 am – 3:30 am; no hauling on weekends
- New access ramps constructed to keep sediment hauling away from residential areas
- A sound barrier will be built for the new entrance ramp
- Water will be sprayed on soil for dust control
- Construction inspectors will be onsite
- A truck IMP will be implemented including initial testing for compliance with the California Air Resource Board's (CARB's) Periodic Smoke Inspection Program (PSIP) with a more stringent threshold than what is currently required.
- Visual observation of trucks and checking the Malfunction Indicator Light status
- Use of model year 2010 emission-compliant trucks
- Check the material loaded has the proper freeboard
- Use of rumble plates as trucks exit the site and street sweeping

2.3 Targeted Air Pollutants and Meteorological Measurements

For compliance air monitoring, the targeted air pollutant will primarily focus on particulate matter with an aerodynamic size of less than 10 micron (or PM_{10}).

For ambient air quality monitoring, the target air pollutants will include PM_{10}, black carbon (BC), and nitrogen oxides or NO_x (NO/NO_2). Initially, a portable meter will be used for or NO_x. $PM_{2.5}$ monitoring may be initiated at the La Canada High School and other stations at a later date.

Meteorological measurements at three monitoring stations will include a tower equipped with wind (wind direction/wind speed), humidity, and temperature sensors.

2.4 Proposed Monitoring Sites

Meteorological conditions, particularly prevailing wind patterns at the project site, are an important consideration in selecting monitor locations. The project site has typical south coast air basin air flow pattern, which has daily on-shore/off-shore air flow or diurnal wind pattern, as follows:

- From about midnight to about 10 AM, there is a northeasterly wind
- From about 11 AM - Noon, the wind direction shifts
- From about 1:00 PM to about 10 PM, there is a southwesterly wind
- From about 11 PM - midnight, wind direction shifts

A wind rose graph for an Altadena station is presented in Attachment 2.

The station monitors will be located so that there is an upwind location and a downwind location, depending on the time of the day. This layout will give a clear picture of impacts from 210 freeway traffic and potential impacts from the project operation at receptor sites: LCHS and Hillside Learning Center, and residential areas.

The sediment removal area for the first year is shown in Figure 1, along with the six proposed air monitoring stations. The truck haul routes are provided as Attachment 3.

2.5 Proposed Monitoring Frequency

The initial phase of air sampling is expected to be performed from May through November 2019, consistent with the sediment removal operations. Baseline sampling is anticipated to commence the first week in May. PM_{10} will be sampled continuously, recorded in 15-minute intervals, and the hourly average will be reported for the six proposed sample stations shown in Figure 1. Hand-held gas meters will be used to monitor NOx at the project site and receptor sites during the sediment removal operating hours. Initially, Tetra Tech field engineers will visually observe conditions and use the hand-held gas monitors to screen areas to determine if there are areas with elevated gas concentrations (such as exceeding California or National Ambient Air Quality Standards). If the site survey indicates areas with gas concentrations outside of the predetermined stations, the locations may be relocated based on site conditions. Otherwise, the meters will be placed at three of the stations for continuous monitoring as presented in Table 1 below.

2.6 Monitoring Stations and Parameters Measured

The proposed air sampling program is presented in the Table 1. The initial monitoring phase includes particulate monitor stations (PM_{10}), MultiRAE meters, and meteorological towers. Due to the lack of A/C power, security concerns, and the availability of equipment, other equipment (e.g., BC analyzers) will be phased-in at a later date.

Table 1. Proposed Monitoring Stations and Parameters

Station ID	Sampling Station	Parameter Measured	Comments
1	Upwind from Freeway (afternoon) / upwind of Site (night)	- PM_{10} and BC - NO_x, - wind speed, wind direction, temperature, humidity	Conduct background sampling and during project implementation
2	Upwind from Freeway (afternoon) / downwind from Site (night)	- PM_{10} and BC - NO_x - wind speed, wind direction, temperature, humidity	Conduct background sampling and during project implementation. Station set up at La Canada High School (community monitoring).
3	Perimeter monitoring	PM_{10} and BC	West side of site fence line monitoring
4	Perimeter monitoring	PM_{10} and BC	Southwest side of the sediment removal area to monitor project and freeway emissions
5	Perimeter monitoring	PM_{10}, and BC	East side of site fence line monitoring, west of residential area
6	Source monitoring	- PM_{10} and BC - NO_x - wind speed, wind direction, temperature, humidity	Truck route monitoring southwest of residential area

Notes:
1. It is expected that the particulate monitors and weather stations will be installed on or around May 10 to collect baseline data
2. Initially, EBAM monitors will be installed due to the high energy demand of the BAM 1020, and the unavailability of electricity.
3. $PM_{2.5}$ monitoring may be implemented at a several of the stations at a later date
4. BC analyzers will be installed at a later date

2.7 Implementation Strategy

Due to time and site constraints (equipment availability, lack of power supply, access, security, etc.), the monitoring program will be implemented in phases. The first phase will start in May to collect baseline air pollutant concentration levels at selected locations and the project site. The target pollutants will include

PM_{10} using battery powered E-BAM PM_{10} monitors, and NOx using portable MultiRAE NOx analyzers. Meteorological towers will also be installed.

PM10 monitors will be installed at the select locations. Portable NOx analyzer will be used to screen potential hot spots along perimeter of the project site and adjacent neighborhood areas. Then the portable NOx analyzer will be installed as a stationary monitor at select locations.

The purpose of taking this alternative monitoring strategy is to overcome the challenges of lacking grid power supply at the selected monitoring locations for air quality monitors; and, to allow to measure baseline air pollutant levels before the project starts, which has a very narrow time window.

In the meantime, the team will continue working on solutions regarding monitoring station logistics. The second phase will commence after logistic issues are resolved and may include additional measurement parameters as listed in Table 1.

2.8 Proposed Monitoring Equipment

The following equipment will be utilized for Phase I of the compliance monitoring:

- Met One E-BAM continuous particulate monitors for measuring airborne PM_{10}
- Rae Systems MultiRAE-PGM 6228 capable of monitoring NO and NO_2
- Davis weather monitoring station or equivalent

Met One Instruments BC 1054 Multi-spectrum Black Carbon Analyzer or equivalent for real time measurement and calculation of black carbon concentration, and other PM_{10} and/or $PM_{2.5}$ monitors may be installed during phase 2 monitoring.

2.9 Quality Assurance and Quality Control

Tetra Tech will use direct-reading instruments with data logging capability and will follow standard operation procedures when using equipment. Equipment will be calibrated, and field logs will be maintained. Field Quality Assurance and Quality Control (QA/QC) will consist of proper equipment calibration, accurately documenting monitoring activities using appropriate field logs, following the developed sampling procedures, and adherence to instrument manufacturer operating procedures.

Tetra Tech will ensure that regular field audits of the monitoring procedures and monitoring records are conducted to maintain a high level of quality assurance. Tetra Tech will ensure that all work conducted will be carried out in accordance with this workplan.

Detailed QA/QC procedures and standard operating procedures will be provided in an updated version of the Workplan.

2.10 Data management

Data management ensures that all collected samples are validated, and QA/QC checked prior to being analyzed and presented. Collected data will be stored and immediately backed up when field personnel returned to Tetra Tech's office. Tetra Tech's project management will perform the following:

- Checking field data are collected and downloaded in accordance with equipment specification and all samples are accounted for.
- Checking the reporting levels meet or are lower than reporting levels and benchmark values.
- Reviewing data for outlier values, including unit reporting errors, or incomplete results. In these cases, interview with field personnel shall be followed up to identify, clarify, and/or correct relevant errors.
- Reviewing sampling results to check for precision and accuracy.

3. DATA ANALYSIS

3.1 Compliance Monitoring

For compliance air monitoring, PM_{10} and meteorological data will be reviewed to assure the monitoring data does not exceed the regulatory threshold of 50 ug/m^3 level for PM_{10}. If the results show emissions exceedance, the construction site supervisor will be informed ~~immediately~~, and proper dust control mitigation measures will be implemented to bring the emission down below the permissible threshold level.

3.2 Ambient Air Quality Monitoring

For ambient air quality monitoring, air pollutant levels at corresponding upwind/downwind locations will be analyzed along with meteorological data, specifically wind direction and wind speed, to assess potential air impacts from project operations or nearby freeways/roadways. For example, elevated PM, BC, and NOx levels could be an indication of vehicle emissions impacting the monitoring site. Depending on the wind direction/wind speed, the time of the day, and the level of project activities (i.e., sediment removal operation and haul truck traffic), the concentration differences between the two sites may be used to assess whether the air quality impact originated from the nearby freeway or from the project site.

California and/or National Ambient Air Quality Standards (CAAQS/NAAQS) will be used as reference/threshold levels for specific target pollutants. If ambient levels of target pollutants exceed the CAAQS/NAAQS, additional mitigation measures will be reviewed and implemented.

Tetra Tech will evaluate the results from the baseline monitoring and from the first few weeks during project implementation in collaboration with AQMD and CARB, prepare summary reports, share the data with the public. Recommendations may be made to discontinue certain monitoring, deploy additional monitoring stations, or monitor for additional constituents.

Data will be uploaded to County's website: https://dpw.lacounty.gov/swe/devilsgate/

Figure

Figure 1, Approximate Locations of Proposed Air Monitoring Stations

Attachments

Attachment 1, Devil's Gate Reservoir Restoration project

Attachment 2, Wind rose graph

Attachment 3, Truck Haul Routes

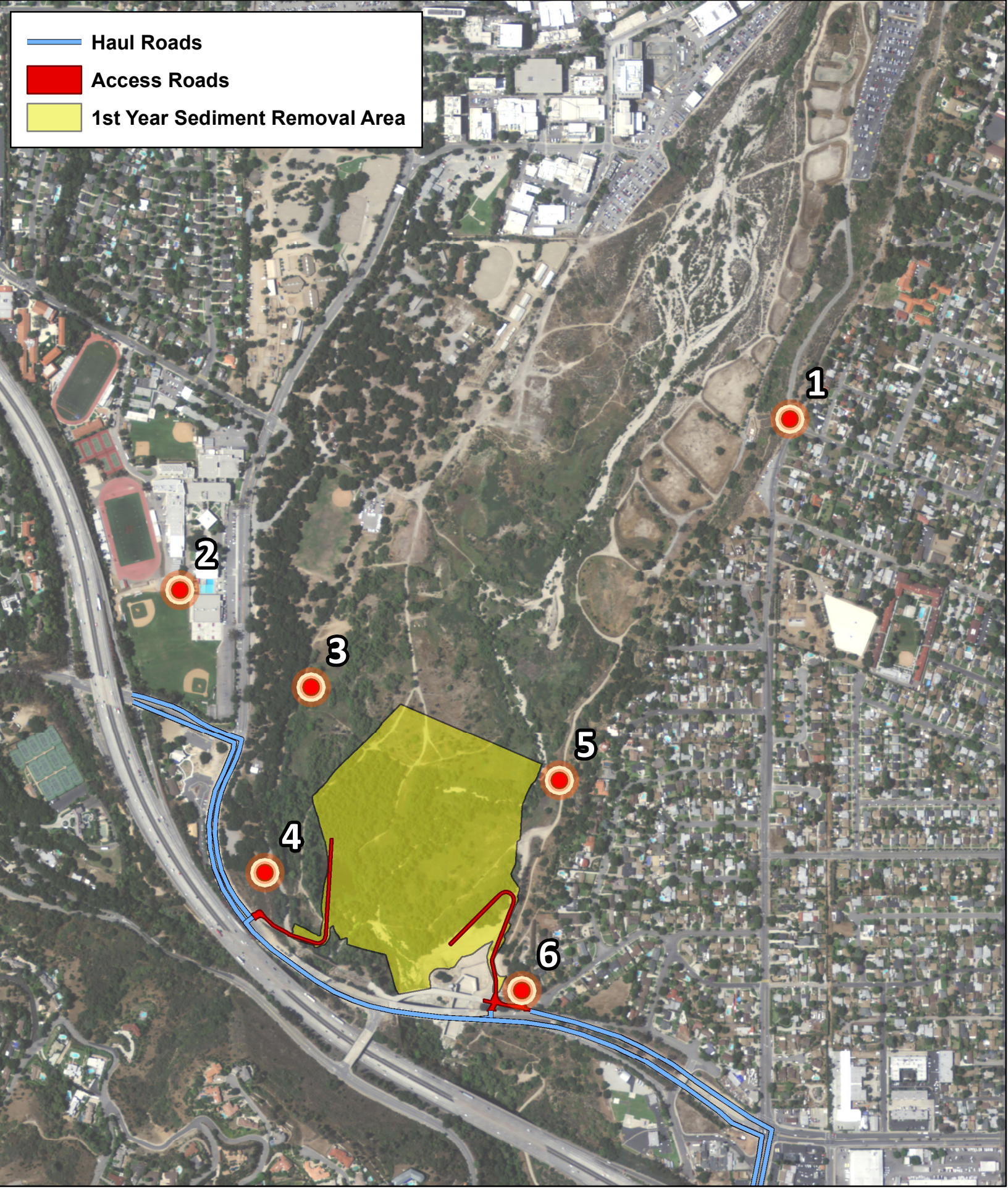

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Figure 1
Approximate Locations of
Proposed Air Monitoring Stations

DRAFT

0 500 1,000 Feet

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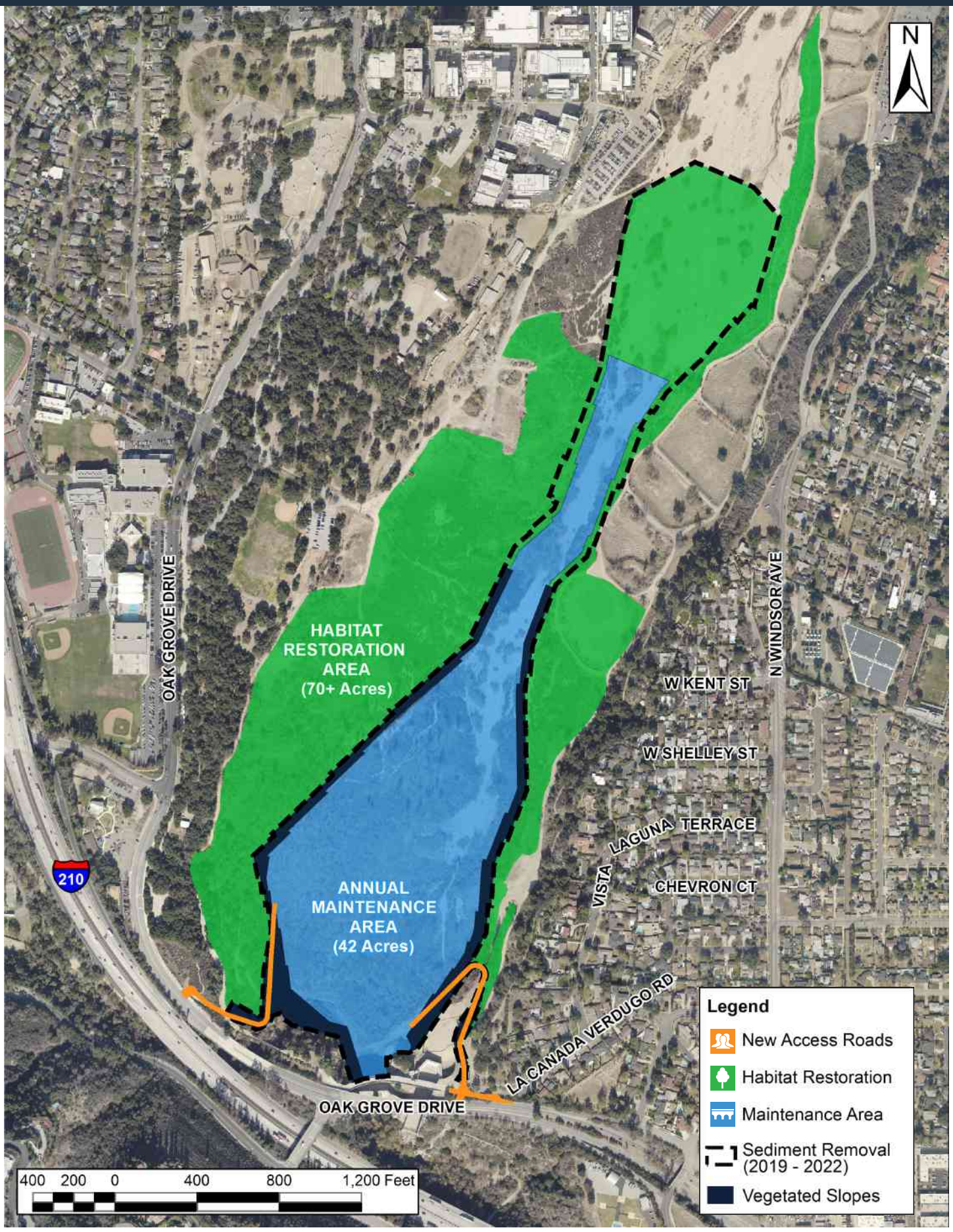
ATTACHMENT 1

Devil's Gate Reservoir Restoration Project
Los Angeles County Public Works

Devil's Gate Reservoir Restoration Project

devilsgateproject.com devilsgateproject@dpw.lacounty.gov Hotline (626) 458-2507

Public Works
LOS ANGELES COUNTY



ATTACHMENT 2

Wind Statistics for Altadena

BACK TO MAPS

ADD FAVORITE

Wind & weather statistics

Altadena

3mph 73°F

South-Southwest

Report from local weather station at 3:50 PM local time.

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SUNRISE	SUNSET	LOCAL TIME	ELEVATION
6:08 AM	7:31 PM	4:11 PM (UTC -7)	1643.7ft

FORECAST(/FORECAST/ALTADENA) WEATHERFORECAST(/WEATHERFORECAST/ALTADENA) REPORT(/REPORT/ALTADENA) WINDSTATISTICS(/WINDSTATISTICS/ALTADENA) WEBCAMS(/WEBCAMS/ALTADENA)

START

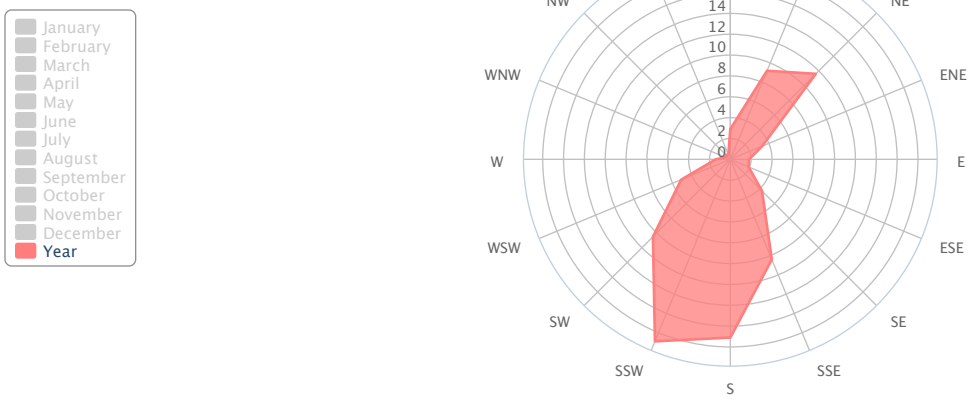
Month of year	Jan 01	Feb 02	Mar 03	Apr 04	May 05	Jun 06	Jul 07	Aug 08	Sep 09	Oct 10	Nov 11	Dec 12	Year 1-12
Dominant wind direction													
(%)	0	0	0	0	0	0	0	0	0	1	0	1	**1**
Average Wind speed (/wind/windspeed.htm) (mph)	1	2	2	2	2	2	2	2	2	2	1	1	**1**
Average air temp. (°F)	55	54	57	61	61	66	70	72	73	68	59	55	**61**

BACK TO MAPS Find spot or weather station FAVORITES SETTINGS HELP (/help/) MORE

WIND STATISTICS

Statistics based on observations taken between 07/2013 - 03/2019 daily from 7am to 7pm local time. You can order the raw wind and weather data in Excel format from our historical weather data request page (/historical-weather-data/).

Wind direction distribution in %



ATTACHMENT 3

Truck Haul Routes
Los Angeles County Public Works


During AM Drop Offs (7:00 am – 10:00 am)
After AM Drop Offs (10:00 am – 3:30 pm)
Hauling when School is on Summer Break
(7:00 am – 3:30 pm)
La Canada High School
Berkshire Place
Oak Grove Drive
Berkshire Ave
22A
Pasadena City
Parkland
Hillside Learning Center
Devil's Gate Dam
La Cañada
Verdugo Road
Windsor Ave
Windsor Avenue
Alberta St
Crosby St
Sol Ave
Yucca Ln
Highland Dr
159
22B
Linda Vista Ave
W Woodbury Rd
Canada Ave
210
W Montana St
Casitas Ave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