# DEVIL'S GATE DAM AND RESERVOIR
# SEDIMENT MANAGEMENT PLAN

Introduction:

Annual maintenance of the Devil's Gate Reservoir will occur in accordance with the Devil's Gate Reservoir Sediment Removal and Management Project and associated Final Environmental Impact Report. The Devil's Gate Reservoir Sediment Removal and Management Project consists of two phases: (1) the sediment removal phase, and (2) the reservoir management phase.

The sediment removal phase, the Devil's Gate Dam and Reservoir Sediment Removal Project, included: 1) the construction of a new access road into the reservoir, and the upgrade of an existing access road 2) the removal of vegetation from a 42-acre footprint and 3) the excavation of 1.3 million cubic yards (cy) of sediment from behind Devil's Gate Dam in order to restore capacity within Devil's Gate Reservoir and minimize the level of flood risk to downstream communities along the Arroyo Seco. Sediment removal and hauling initiated in April 2019 and was completed by September 2021. The Devil's Gate Dam and Reservoir Sediment Removal Project resulted in a reservoir configuration and access to facilitate future routine annual management and sediment removal.

The reservoir management phase is expected to start in 2022, after the completion of the sediment removal phase. After the initial sediment removal activities, the reservoir will be managed through vegetation maintenance, sediment excavation and trucking offsite, and Flow-Assisted Sediment Transport (FAST). The access roads will also be maintained to provide proper road width and safety for access. The purpose of the annual management activities, described below, is to reduce buildup of sediment in the reservoir management area over time and eliminate or substantially reduce the frequency of subsequent large-scale sediment removal projects. The annual maintenance plan will incorporate adaptive management to include any potential modifications that will assist in the removal of the sediment and enhancing best management practices.

## A. Proposed Annual Maintenance Activities

The reservoir configuration shown in Attachment 1 will be maintained with the approximate cut and elevation levels established with the Devil's Gate Dam and Reservoir Sediment Removal Project. The area to be annually maintained through vegetation clearance and sediment removal is approximately 36 acres. The entire 49-acre permanent maintenance basin (36.27-acre basin, 7.88-acre side slope area, 1.32 acre Flint Wash, and 4.46 acre east and west strips) will be kept clear of non-native/exotic vegetation. Access ramps will be maintained and repaired due to any erosion from the storm season. Sediment hauling will occur Monday through Friday, 7am to 3pm and work within the reservoir may continue until 6pm, in accordance with the Environmental Impact Report.

## 1. Dam Operations & Flow-Assisted Sediment Transport

Dam operations are dependent on the forecasted and existing rainfall/inflows, watershed conditions including expected sediment inflows, and dam and downstream conditions. Following the Devil's Gate Dam and Reservoir Sediment Removal Project, dam operations are expected to return to a regime consistent with operations prior to the Station Fire. The lowest elevation valve would be generally left open prior to the first significant rain event of the season, to utilize Flow-Assisted Sediment Transport (FAST). During a FAST operation, natural flows will pass finer grain size sediment through the reservoir and downstream of the dam. FAST operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. A FAST operation uses the storm runoffs throughout the storm season to flush the sediment out of the reservoir. This is a passive method that does not use any mechanical agitation or assistance. This method works effectively when sediment deposition behind the dam is minimal. A FAST operation, if performed regularly, can be used to reduce sediment accumulation in the reservoir and thus help maintain capacity. The amount of sediment that will be removed through FAST operations is limited by the amount of storm runoff received into the reservoir.

It is anticipated that the majority of these FAST operations will be similar to historic FAST operations and that fine sediment discharged during FAST operations will be transported to the Pacific Ocean via Arroyo Seco Channel and the Los Angeles River, either via discharge flow or subsequent storm flows.

During a rain event, if water pools and the water surface elevation continues to rise, the lowest elevation valve is closed and water is ponded behind the dam to create a pool that prevents sediment and debris from damaging or blocking the valves and gates of the dam. Two larger slide gates are then operated to manage the reservoir elevation, control outflow, and prevent flows from overwhelming the downstream channel. If weather, hydrological forecasts, and reservoir conditions indicate that water held behind the dam may inundate the mitigation site, then the Dam Operator, in consultation with the Operations Section of the Stormwater Engineering Division of Los Angeles County Public Works (PW), will take the steps necessary (including release of water at the maximum possible rate as safe to do so to protect downstream communities), to prevent or to reduce, to the extent possible, the amount of time the mitigation site is inundated.

During storm events, the pool may be held for an extended period to allow for booming operations, during which boats and floating booms will be used to bring floating debris to the sides of the reservoir. If the west ramp is not accessible due to the surface water elevation, the debris will be hauled off site through the southeast exit.

A seasonal pool will be held within Devil's Gate Reservoir after each storm season. In July, the lowest elevation valve will be opened to release any remaining water that may be pooled behind the dam. As a part of routine dam operations, the reservoir will be empty prior to the start of annual maintenance activities.

2. Vegetation Maintenance

Vegetation within the reservoir configuration will be mowed or removed and grubbed annually. These activities will occur Monday through Friday over an estimated three-week period in the late summer or early fall. All native vegetation outside the Annual Reservoir Maintenance footprint, as shown in Attachment 1, will be allowed to naturally re-establish and/or remain in place. All non-native/exotic vegetation within the 49-acre permanent maintenance baseline will be removed following the on-site Habitat Mitigation and Monitoring Plan (HMMP) schedule to ensure such non-native vegetation growing in the basin does not compromise the success of the on-site permittee-responsible compensatory mitigation. As with the initial sediment removal phase, all vegetation and organic debris will be separated from the sediment and hauled to offsite landfills.

3. Sediment Excavation/Trucking Offsite

Depending on the efficiency of the FAST operations, some mechanical excavation and trucking offsite will be required for removal of accumulated sediment. Sediment excavation/trucking offsite will use the same methods and trucking routes as the initial sediment removal phase, trucks entering the reservoir from the facility's east entrance on Oak Grove Drive will be loaded with sediment, exit the west access ramp onto Oak Grove Drive, and head north to Berkshire Place for freeway access (See Attachment 2). The need for future sediment removal will depend on future storm activity and associated sediment accumulation.

It is estimated, based on past storm events with an unburned watershed, that sediment excavation/trucking offsite will be required to typically remove approximately 13,000 cy of sediment annually. Based on an estimated removal of a maximum of 4,800 cy per day, it is expected at least a two-week work period, Monday through Friday, would be needed. This removal activity will take place during the late summer/early fall following the vegetation maintenance. Removal of the sediment, vegetation, trees, and organic debris is expected to require an average of 50 truck round trips per hour, with a maximum of 300 truck round trips per day during excavation activities.

Moderately large sediment deposits have the potential to occur during a storm season, but it is anticipated that even with this type of event the newly deposited sediment could be removed in one season. A moderately large sediment removal event, anticipated to involve around 170,000 cy, could take place over an estimated 12-week period during the late summer/early fall following the vegetation maintenance, and excavation of sediment will be limited to 220,000 cy per year. In the event that a very high volume of sediment enters the reservoir, a sediment cleanout project may be needed if the annual maintenance is not sufficient to provide adequate flood protection to downstream communities. Additional work time within the reservoir may be needed to repair erosion and rebuild the low flow diversion and channels.

4. Episodic Maintenance

Episodic Maintenance within the 7.87-acre side slopes surrounding the Annual Reservoir Maintenance Area, as shown in Attachment 1, will initially include planting with appropriate native plants. The maintenance activities related to sediment removal and repair of the side slopes will only occur after large storm events that damage portions of the side slopes or when erosion compromises a section of the side slopes. The maintenance activities will be limited to the locations where sediment has accumulated and will only consist of the removal of accumulated sediment and repair of the side slopes. The vegetation buried by sediment may be removed when the side slopes are recontoured. PW does not anticipate that all 7.88 acres of the side slopes will need to be repaired in the same season or that repair will be necessary on a frequent basis. The primary purpose of the Episodic Maintenance is not to remove vegetation but only to repair the side slopes so they can revegetate with native plant species.

As depicted in Attachment 1, episodic maintenance will occur in two 75' wide strips adjacent to the east and west side slopes of the basin.

0.6 acres near the Altadena drain and 1.22 acres near the Flint Wash will be excluded from Annual and Episodic maintenance except as reasonably necessary to repair erosion or to address overgrowth clogging drainage.

Regular maintenance on the side slopes will include the removal of non-native and invasive plant species to limit the spread of these species throughout the mitigation areas. Regular maintenance will be conducted at the same time that maintenance activities are conducted in the mitigation areas. Regular maintenance will typically occur on a semiannual basis and will include the use of string-trimmers, and hand-pulling. A Restoration Monitor will be present during the maintenance activities in the mitigation areas and on the side slopes. The intended vegetation on the side slopes is riparian scrub (mulefat and other shrubby species), which will provide foraging opportunities for least Bell's vireos and other wildlife species and will create a buffer between the annual maintenance area and the mitigation areas. The Restoration Monitor will ensure that the Landscape Contractor's crew only remove species that are appropriate for removal (i.e., nonnative and invasive plant species).

If recontouring of any portion of the side slopes is necessary, the Restoration Specialist will evaluate the need to reseed the side slopes after the recontouring is completed. The vegetation that grows on the side slopes is expected to provide a good seed bank in the soils so after the recontouring is completed, the non-native and invasive plants will be controlled to allow the native plants to revegetate naturally. If the vegetation on the side slopes does not successfully germinate and grow, then reseeding of the side slopes may be conducted. The Restoration Specialist will monitor the repaired portions of the side slopes to evaluate if reseeding is necessary and when it would be appropriate.

## B. Best Management Practices (BMPs)

The following environmental safeguards will be implemented as part of annual sediment management:

- No project equipment-related materials (i.e., waste, spills, or residue) will be discharged from the project site to streets, drainage facilities, receiving waters, or adjacent property by wind or runoff.
- Non-stormwater runoff from equipment, vehicle washing, or any other activity will be contained within the project site using appropriate BMPs.
- Debris generated from construction activities will be properly contained.
- Grading will be scheduled so the majority of the work in the reservoir is completed during the dry season or during clear weather forecasts. Erosion susceptible slopes resulting from project activities will be protected through design/construction techniques such as proper grading, planting, covering, or other BMPs.

## C. Environmental Protections

PW will comply with all conditions set forth in the permits obtained for the Devil's Gate Reservoir Sediment Removal and Management Project, including: United States Army Corps of Engineers Section 404 permit (SPL-2014-00591-BLR), Regional Water Quality Control Board 401 Water Quality Certification (15-053), California Department of Fish and Wildlife Section 1600 Lake and Streambed Alteration Agreement (1600-2015-0263-R5), and California Department of Fish and Wildlife Incidental Take Permit (2081-2016-031-05). Permit extensions will be sought prior to expiration in order to continue maintenance activities within Devil's Gate Reservoir without interruption.

PW is the agency responsible for implementation of the mitigation measures identified in the Final Environmental Impact Report (EIR), certified November 12, 2014, and the Recirculated Portions of the Final EIR, certified November 7, 2017. The EIR mitigation measures pertaining to the sediment management phase are detailed in the Mitigation Monitoring and Reporting Program, which can be found on the website.

PW will also implement the following conservation measures as part of annual sediment management to avoid and minimize impacts to the federally endangered species, least Bell's vireo:

1. Carlsbad Fish and Wildlife Office (CFWO)-approved biological monitor(s) will be retained by PW to conduct activities as specified in the measures below. The biological monitor(s) will be a trained ornithologist with at least 40 hours of supervised experience locating vireo and mapping their locations in the field. At least 7 days prior to initiating project activities, the PW will submit to the CFWO, in writing, the name(s), any permit numbers, and resumes of all proposed biological monitors. Proposed activities will not begin until a biological monitor has been approved by the CFWO. The biological monitor

will have the authority to halt/suspend all activities that do not adhere to the construction related Conservation Measures (1-7).

2. The biological monitor will conduct orientation meetings for construction personnel to review: a) a description of vireo and its habitat on the project site, b) construction limits, and c) the conservation measures that will be implemented in conjunction with project construction (i.e., Conservation Measures 1-7).

3. Under the supervision of the biological monitor, all preserved riparian vegetation adjacent to the outer limits of disturbance (Attachment 1) will be delineated by bright orange plastic fencing, stakes, flags, or markers that are clearly visible to personnel on foot and in heavy equipment. No vegetation removal, grading, or deposition of waste dirt/rubble will occur in riparian vegetation outside of the outer limits of disturbance.

4. All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other such activities will be restricted to designated disturbed/developed areas. These designated areas will not be located within waterways or riparian areas and will be located in such a manner as to prevent runoff from entering existing native vegetation areas and will be clearly designated on the construction plans.

5. All activities involving the removal of riparian vegetation will occur outside of the vireo breeding and nesting season (March 15 to August 31).

6. If construction occurs between September 1 to March 14 (outside of the vireo breeding and nesting season), a designated construction monitor will conduct twice weekly inspections of the project site and will have the authority to halt/suspend all activities that do not adhere to the construction-related Conservation Measures (3 to 5). The construction monitor will report impacts to vegetation beyond the outer limits of disturbance immediately to the CFWO and will provide, on a monthly basis to the CFWO, a brief summary (including photos) of project activities completed.

7. Sediment removal activities, including the initial reconfiguration of the basin and annual maintenance, will be scheduled between September 1 to March 14 (outside the vireo breeding and nesting season) to the extent possible however, if sediment removal is conducted between March 15 and August 31 (during the vireo breeding and nesting season):

a. Nest buffer: Surveys by the biological monitor will be conducted a minimum of three times on separate days to determine the presence of vireo nest building activities, egg incubation activities, or brood rearing activities within 300 feet of the project area. These surveys will be conducted within the week prior to the initiation of project activities. One survey will be conducted the day immediately prior to the initiation of project activities. If no nests, nesting behavior, or brood rearing activities are detected within 300 feet of the project area, work may commence. If nesting vireos are detected, nest monitoring will be initiated and work will be postponed within 300 feet of the nesting pair(s)

until the nest is determined either a success or failure by the biological monitor and CFWO agrees that work may proceed.

b. Noise buffer: Construction noise levels will be restricted to below 60 dBA Leq hourly at 100 feet from areas occupied by the vireo. Twice weekly surveys for the vireo will be conducted by the biological monitor in areas of suitable habitat within 500 feet of proposed construction activities to determine the presence of vireo nest building activities, egg incubation activities, or brood rearing activities. If vireos are present, noise monitoring will be conducted weekly and must demonstrate that noise levels are less than 60 dBA Leq hourly at specified monitoring locations, no less than 100 feet from the active nest(s) as determined by the biological monitor. Weekly survey reports will be prepared during the nesting season and sent electronically to the CFWO each week that vireos are detected. The weekly reports will identify the location of vireo nest sites and territories within 500 feet of the project.

**D. Community**

The following best management practices will be implemented as best practicable in support of the surrounding communities:

- Dust Control
    - Water trucks will be used within the reservoir and along the access routes
    - Rumble plates will be installed, and periodically maintained, on the west exit ramp
    - Monitors will observe excavation activities for excessive dust and apply corrective actions if needed
    - Trucks may be swept with brooms before exiting
    - Soil binders may be used on the exit ramp if needed
    - Street sweepers will routinely operate on Oak Grove Blvd, focusing on the west exit, and any runoff will be controlled as to not create standing water or mud in the adjacent oak woodland within Hahamongna Watershed Park
- Safety
    - Off-site hauling activities shall be permitted by City of Pasadena Department of Public Works with specific work duration, scope, contact information, and approved truck route on an annual basis.
    - Temporary high visibility construction signs, under City of Pasadena permitted approval, will be posted at haul route crossings with pedestrian paths, including along Oak Grove Blvd, the southeast entrance, and the southwest ramp. Flaggers may be used during larger operations or periods of high traffic volume.
    - Lanes may be diverted or closed along Oak Grove Blvd only if needed due to larger excavation activities with a higher volume of truck trips, and will follow the approved haul route per Attachment 2.
    - Newsletters, email notifications, and website updates will typically be sent out two weeks prior to the annual maintenance activities

- School schedules will be taken into consideration when coordinating the annual maintenance activities
- Truck staging and idling time will be monitored within the reservoir, and trucks shall not idle on public roads. Onsite storage of trucks and construction equipment shall not be within any habitat or public trails.
- Trucks shall adhere to current applicable AQMD Standards
- All trails shall remain open, however the east and west access ramps from Oak Grove Blvd into the reservoir will be closed to the public on working days. Potential impacts to the trails will be coordinated and mitigated per City of Pasadena approval.
- The work hours within the public right-of-way shall be from 7:00 am to 3:00 pm every weekday, excluding holidays as defined in the City's calendar. No work shall occur during major Rose Bowl events.
- Due to the City's holiday moratorium, no construction or road closure is allowed within the public streets between middle of December to first week of January each year. This condition is not applicable to travelling and/or hauling vehicles nor to work within private property.

# Attachment 1

## Revised Project Boundary

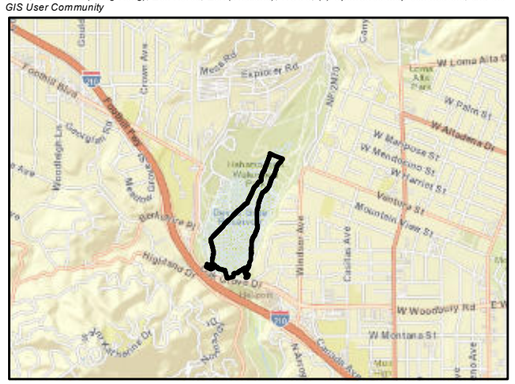
**Map Features**

- Final Design Boundary
- Project Impact Footprint

Impact Limits

- Routine Annual Maintenance Area - 36.27 ac.
- Side Slopes (Episodic Maintenance Areas) - 7.87 ac.
- Flint Wash Side Slope (Exclusionary Area) - 1.32 ac.
- DG - EMA West Side - 2.00 ac.
- DG - EMA East Side 2.46 ac.
- Temporary Impact Area - 3.62 ac.


*Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community*



ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

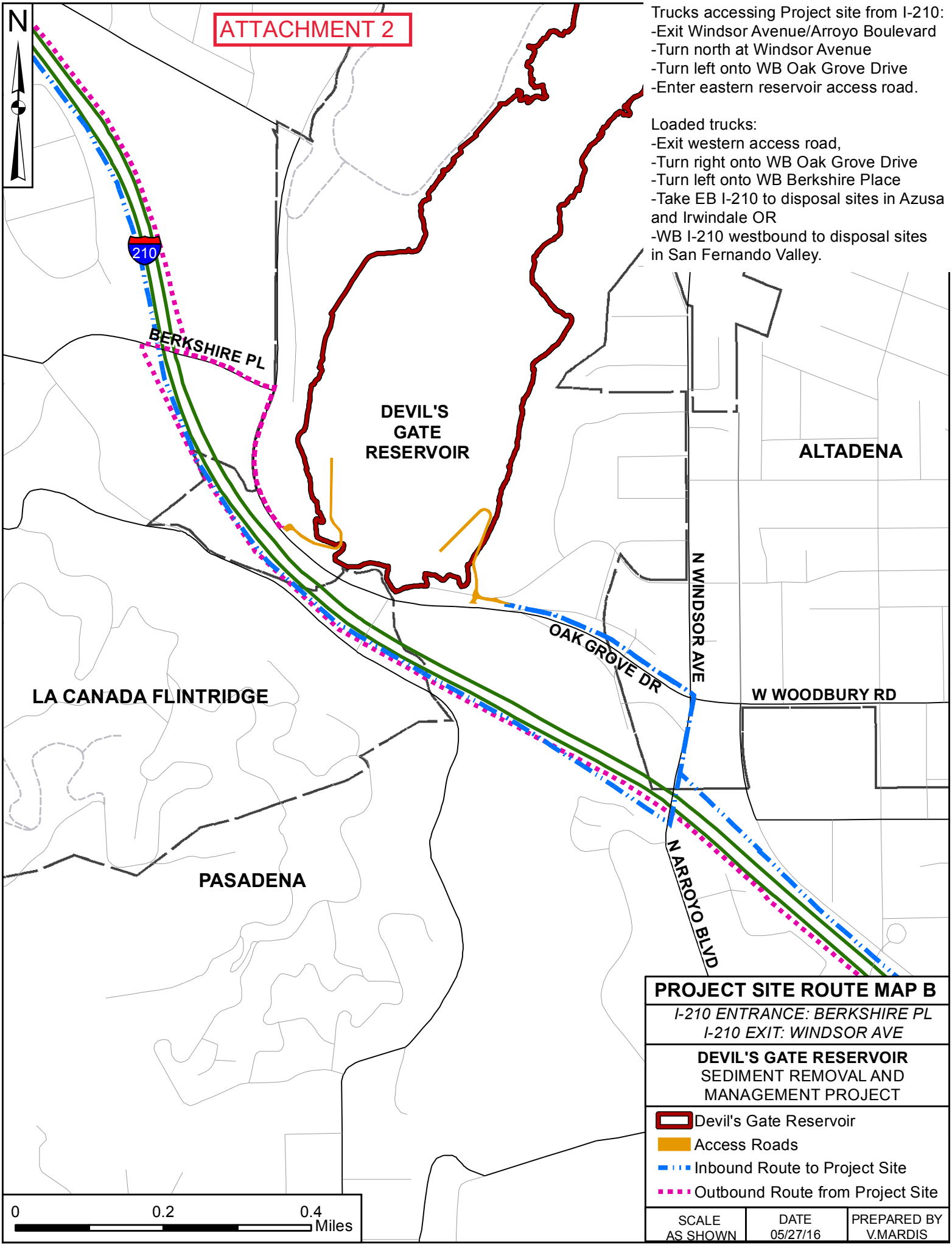
Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\aerial_maps\DG_Aerial_Impacts_20200825.mxd (MAG)-mguidry 8/22/2022

*2018-047 Devil's Gate Sediment Removal Project*

Scale in Feet
0 300

Photo Source: ECORP 2021, NAIP 2020

Map Date: 7/20/2022


ATTACHMENT 2
N
Trucks accessing Project site from I-210:
-Exit Windsor Avenue/Arroyo Boulevard
-Turn north at Windsor Avenue
-Turn left onto WB Oak Grove Drive
-Enter eastern reservoir access road.
Loaded trucks:
-Exit western access road,
-Turn right onto WB Oak Grove Drive
-Turn left onto WB Berkshire Place
-Take EB I-210 to disposal sites in Azusa and Irwindale OR
-WB I-210 westbound to disposal sites in San Fernando Valley.
210
BERKSHIRE PL
DEVIL'S GATE RESERVOIR
ALTADENA
N WINDSOR AVE
OAK GROVE DR
W WOODBURY RD
LA CANADA FLINTRIDGE
PASADENA
N ARROYO BLVD
0
0.2
0.4
Miles
PROJECT SITE ROUTE MAP B
I-210 ENTRANCE: BERKSHIRE PL
I-210 EXIT: WINDSOR AVE
DEVIL'S GATE RESERVOIR
SEDIMENT REMOVAL AND MANAGEMENT PROJECT
Devil's Gate Reservoir
Access Roads
Inbound Route to Project Site
Outbound Route from Project Site
SCALE AS SHOWN
DATE 05/27/16
PREPARED BY V.MARDIS